

ANNALS OF SURGERY

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No. 1

ORIGINAL MEMOIRS.

THE RELATION OF THE MESOCOLIC BAND TO GASTROENTEROSTOMY.

BY WILLIAM J. MAYO, M.D.,

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OTHER things being equal posterior gastrojejunostomy is the operation of choice. This does not mean, however, that the anterior method has become obsolete, but rather that its field of usefulness has been greatly curtailed. All of our earlier operations were made anteriorly, and a number of cases operated upon more than five years ago are to-day in perfect health.

The elimination of the loop has, I believe, been a most important step in advance. The great advantage of the posterior over the anterior method lies in the fact that the anterior requires from 16 to 20 inches of jejunum for the loop around the transverse colon, while no loop at all is necessary in the posterior method.

In the April number of the ANNALS OF SURGERY, 1906, page 537, I called attention to the fact that in the living subject the first portion of the jejunum usually passed from the duodenojejunal angle downward and to the left, and for this reason advised that the jejunum be applied to the posterior wall of the stomach so as not to disturb this normal relationship, instead of turning the bowel on a short angle to the right as had been the custom.

There seems to be some difference of opinion as to just what constitutes the "no loop" operation and particularly as to the frequency with which in the living subject the jejunum passes from its origin to the right. I think that much of the misconception as to the anatomical relationship comes from the variation in degree with which the peritoneal suspensory ligament extends down from the transverse mesocolon upon the upper part of the jejunum. The ligament of Trietz is an unimportant muscular structure covered by a small peritoneal fold as in Fig. I; but this peritoneal reflection may be of such extent as to project downward several inches, as in Fig. II.

It can readily be seen that as the intestinal coil is formed this peritoneal adhesion may extend so far down upon the coil as to reach the jejunum after it has turned to the right, and if the gastrojejunostomy is placed at this point, the intestine will be applied to the posterior wall of the stomach, not in the "no loop" position but upon a loop of from 4 to 6 inches; a situation which experience has shown to be exceedingly liable to give rise to bile regurgitation such as so frequently occurred in the "loop" operations of the past. The operator would erroneously believe that the jejunum turned to the right and that he had made a no loop operation while as a matter of fact a loop was present but more or less concealed in the investing peritoneum. (Fig. III.)

When such peritoneal bands or adhesions exist to any considerable extent they should be trimmed back to expose the origin of the jejunum which will, in the great majority of cases, now be found to run in the normal direction to the left, and the gastrojejunostomy can be made at the beginning of the jejunum in the area which has been denuded of the adhesions. (Fig. III.)

When this peritoneal band is pulled upon it will be found that it has its origin in the transverse mesocolon close to the left margin of the branch of the middle colic vessel which is to be seen in the drawings just to the right of the duodeno-jejunal juncture. The avascular space in the mesocolon lies

FIG. 1



Showing small peritoneal fold, with intestine passing to the left. Normal form.

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FIG. 2.



Showing extensive peritoneal fold which turns the intestine to the right.

FIG. 3.



Shows the peritoneal fold separated. Dotted line shows proper situation for a no-loop gastro-enterostomy. X marks the point in the transverse mesocolon, where the stomach is to be brought out.

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to the left of this adhesion, and through this space the posterior wall of the stomach should be brought out for operation.

There are several situations in the abdomen where peritoneal bands or adhesions are occasionally to be found. These bands may vary within wide limits and again be so frequently absent as to lead to the belief when they are present, that they are pathological; since disease may produce similar results.

In the foetus the lesser cavity of the peritoneum extends down between the omental fold. Soon after birth obliteration has usually extended as high as the transverse colon, and in the adult the obliteration frequently extends higher, especially along the pyloric half of the stomach, so that posterior adhesions limiting the lesser cavity of the peritoneum may be mistakenly thought to be the result of disease. Peritoneal adhesions of the same character are often found connecting the sigmoid flexure of the colon to the pelvic wall. A very common example is the peritoneal reflexion which sometimes joins the gall-bladder on its inner inferior aspect, with the duodenum and transverse colon greatly resembling adhesions produced by cholecystitis.

INTRACRANIAL ABSCESS DUE TO THE TYPHOID BACILLUS.

BY FRASER B. GURD, M.D., AND T. B. NELLES, M.D.,

OF MONTREAL,

From the Pathological Laboratory of the Montreal General Hospital.

THE great dangers in fractures of the skull, either of the vault or base are, of course, in the early days following injury, (1) hæmorrhage either extradural or cerebral and (2) laceration of the brain tissue. Should the time of onset of symptoms due to either of these causes have elapsed, or should operative interference in the meantime have been called for, the temperature chart is carefully watched for evidences of infection at the site of the injury.

Infection may gain entrance to the intracranial cavity through one or more of several channels if the integument and underlying tissues have been lacerated or incised the ordinary organisms from the surface of the body or the air may have easy entrance. A similar portal of entry is afforded by any operation not performed under strictly aseptic precautions. Again the fracture may extend through the bone to one or other of the cranial cavities which communicates with the exterior, such as the nose and ears and their adjacent air cells, or the mouth, which normally contain pyogenic micro-organisms. Another source of infection is by the blood stream. That this form of infection does not more frequently occur is due in part to the fact that patients suffering from the various forms of bacteriæmia do not often receive fractures of the skull. The coincidence of these two misfortunes to the subject of our note was sufficient to induce the unique condition which we are about to describe.

Circumscribed abscess formation in the bones or soft tissues during and following attacks of typhoid fever are not infrequent. In all pyogenic infections local death of the cells due to trauma or other cause undoubtedly acts as a predispos-

ing factor. Abscesses in the coccygeal region are not uncommon as a complication of typhoid fever, a condition, doubtless, due to the invasion by the *B. typhosus* circulating in the blood, of an area where the cells have been injured by pressure. Cases have been reported of periostitis of the tibia in individuals suffering from an unsuspected ambulatory attack of typhoid fever in which a correct diagnosis was only determined by the bacteriological examination of the exudate and blood.

There appears to be in the light of our own case, a reasonable excuse for the suggestion that the occurrence of periostitis of the ribs in typhoid, treated by baths, may be the result of slight trauma received in the handling necessitated by such procedure. This case also demonstrates the presence of an unusual factor which may complicate injury or perhaps even operative procedure, namely, subsequent infection of a blood clot through the circulation.

C. S., aged 25, a machinist, was admitted June 23, 1907, to the Montreal General Hospital, under the care of Dr. Blackader, attending physician, and to his courtesy we are indebted for the medical notes of the case. Very little history could be made out as the patient was stupid and drowsy and his friends apparently knew little about him. It was established that one month previous to admission, in a drunken brawl, the patient had been struck on the right side of the head with a club, and had had a lump on that side of his head ever since. No recent history of injury could be obtained.

Complaints upon admission: headache, constant and severe for eight days; loss of appetite and drowsiness. Patient gives no history of chills, no diarrhoea. He has always been healthy and strong but has used alcohol to excess for years.

Present condition: Patient is of middle age, fairly well nourished, of only fair intelligence. He is very drowsy, but can be roused to answer questions more or less intelligently. Temperature 101° F. Respirations 25. Pulse 72, regular, small volume, low tension. Mucous membranes, nails and palate are of good color. Tongue is coated and dry, teeth are covered with sordes, breath is foul.

The abdomen is normal in contour, there are no rose spots,

spleen is apparently enlarged but not palpable. There is no glandular enlargement palpable.

Respiratory and circulatory systems are practically normal with the exception of a few rales heard all over the chest.

The left eyelid is ecchymotic and slightly oedematous. The right upper lid is discolored but not swollen.

On the right side of the head, above and in front of the ear and extending forward to the supraorbital ridge, the scalp is oedematous, red and tender over an area the size of one's palm. In the right parietal region, towards the posterior part of this area, there appears to be a depression in the skull with an indefinite raised edge. There are also abrasions over the left shoulder and right thigh. There are no subconjunctival hæmorrhages and no evidence of bleeding from the ears, nose or pharynx. There is no proptosis.

Pupils are of medium size, equal and active to light and accommodation.

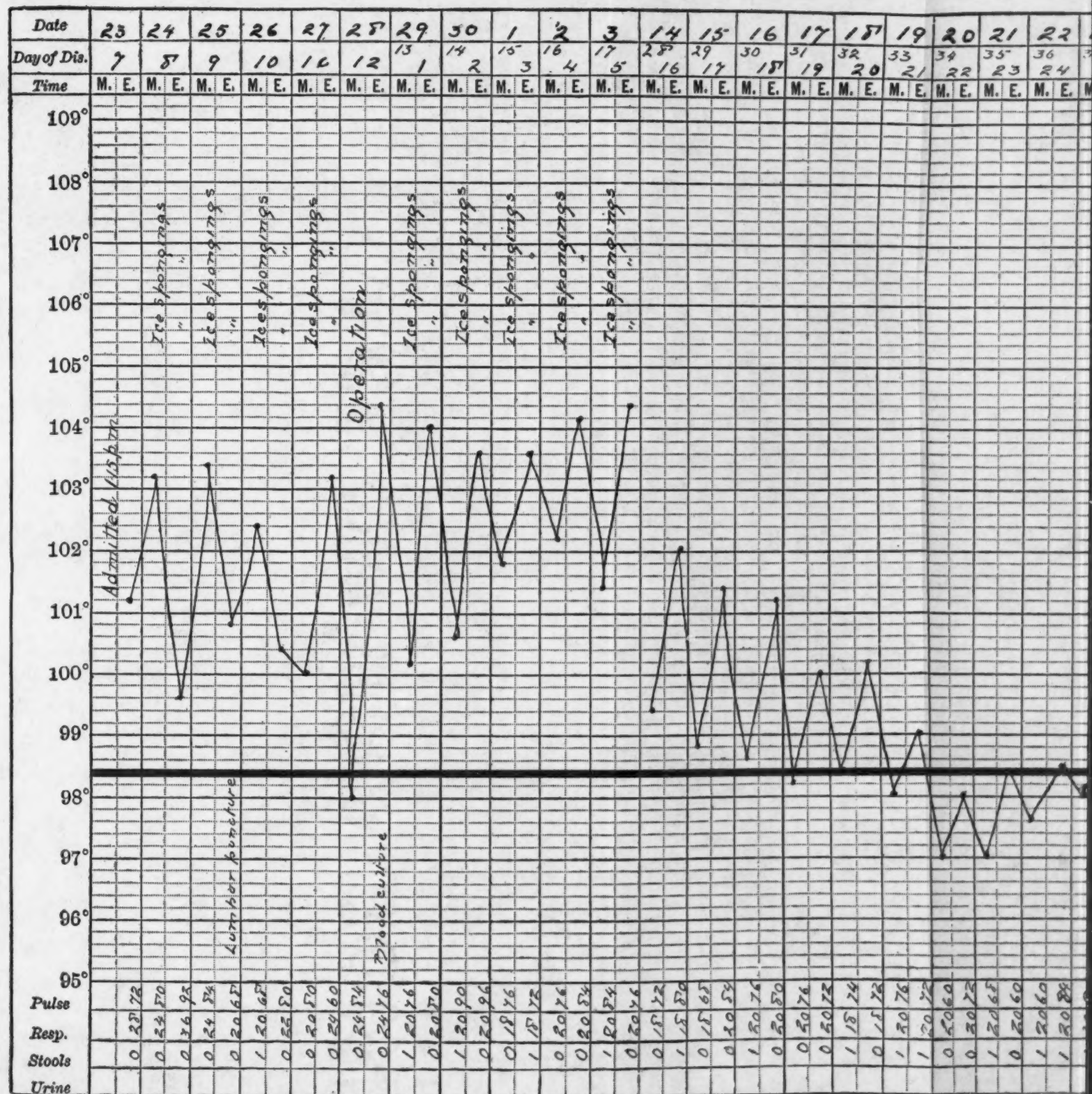
There is no paralysis or paresis, no sensory disturbance.

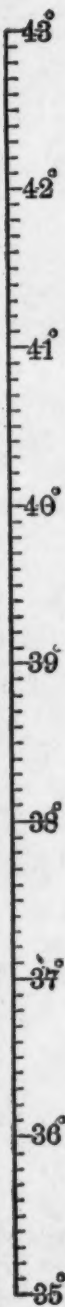
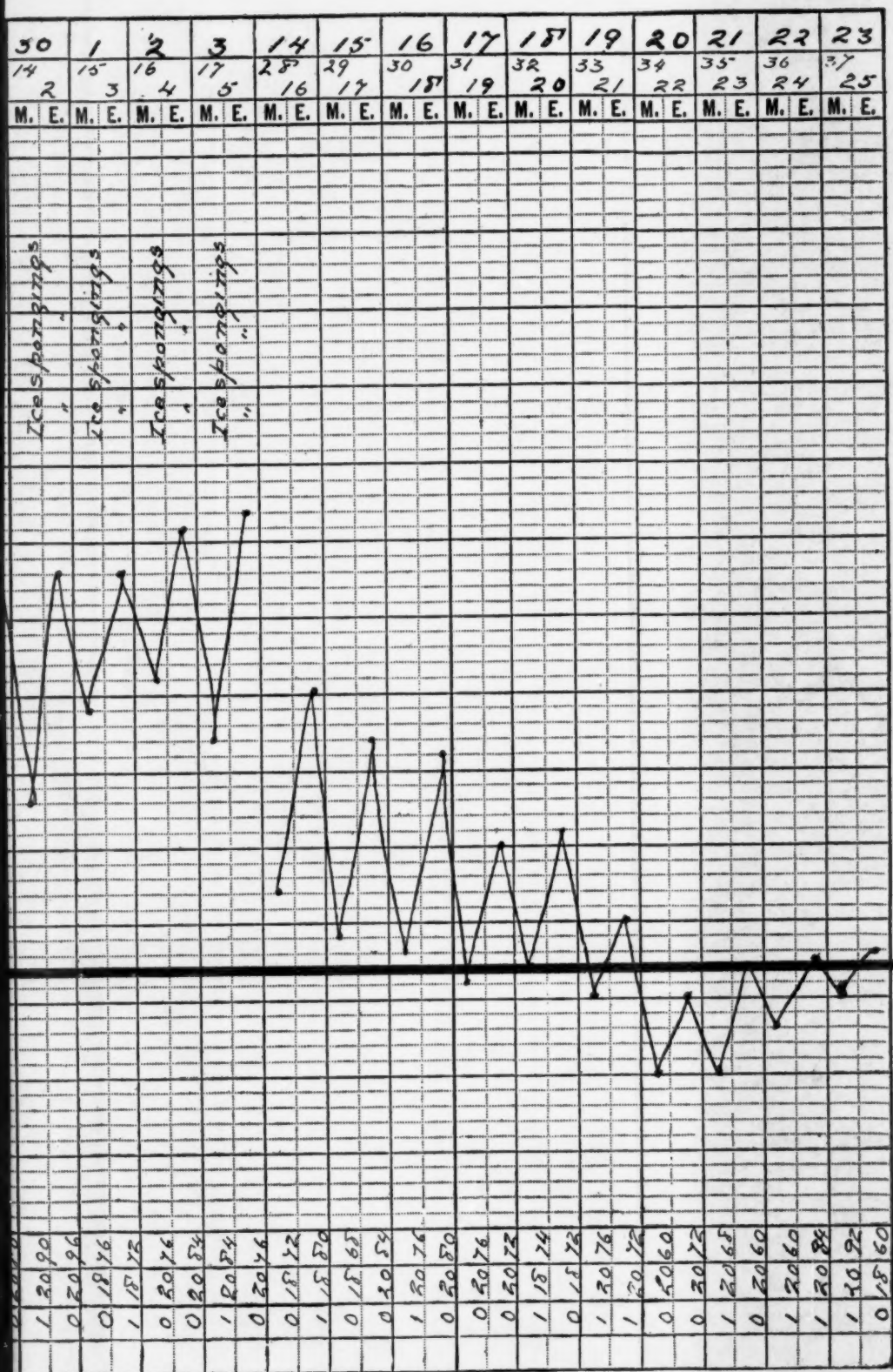
Reflexes: knee jerks are absent, abdominal is absent. A bilateral Kernig's sign is present. There is a stiffness of the posterior muscles of the neck. Patient has incontinence of urine at times.

Diary: June 25, two days after admission, patient has a positive Widal reaction in a dilution of one in eighty and a positive Ehrlich's diazo reaction in the urine. A lumbar puncture performed removes 32 c.c. of clear fluid not apparently under tension. Smears and cultures reported negative. Blood count shows 5000 white cells. During the five days following his admission, patient's condition changed but little. The swelling on the scalp became softer and apparently contained pus. On June 28, the patient was transferred to the surgical side and Dr. Elder at once operated.

Operation.—Under chloroform an incision was made over the softest part of the swelling. About 60 c.c. of pus and blood escaped exposing bare bone. The abscess cavity was curetted and irrigated. This procedure exposed a linear fracture of the parietal and frontal bones extending across the line of incision. The bone behind the fracture was depressed. The skull was trephined over this fracture and when the button of bone was taken out, a somewhat organized blood clot was seen overlying the dura under the

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depression. About 2 c.c. of pus were seen spread out as a thin film over the surface of this clot. With the fingers in the trephine opening this blood clot, apparently about 150 c.c., could be felt to be forcing in the dura. The depressed pieces of skull were elevated and the trephine opening enlarged with rongeur forceps. The clot was then broken up with the finger, the cavity irrigated thoroughly with hot saline solution and packed with strips of iodoform gauze. The wound in the scalp was closed with silk-worm-gut sutures, save where the end of the gauze protruded, and a dry dressing applied.

Following operation the patient's temperature remained continuous in type and moderately high. He was kept on typhoid regimen and his fever gradually dropped to normal during the third week after operation. (See temperature chart.) There were no rose spots at any time and the spleen was never palpable. The patient was discharged well four weeks after operation, and so far as we know, has since remained well and shows no brain symptoms.

Bacteriological report: B. 07,—423, C. S., aged 25, June 28. The pus from the infected hæmatoma of the scalp planted upon blood serum develops in 24 hours a profuse growth of a motile bacillus which when stained by Gram's method and examined microscopically corresponds in morphology and staining reaction to the typhoid-colon group. The organism grown in dextrose agar gelatine semi-solid mixture, produces a heavy cloud without gas formation. Neutral litmus milk is turned a delicate lilac color after twenty-four hours. Dextrose and mannit litmus serum water media are first changed red and subsequently coagulated. Saccharose and lactose are not fermented. The blood serum from a patient in the third week of typhoid fever agglutinates this organism in a dilution of one in eighty.

TABLE I.

*Organism B. 07,423	Dextrose semisolid.	Neutral litmus milk.	Dextrose serum water.	Lactose serum water.	Mannit serum water.	Saccharose serum water.
	No gas. Diffuse turbidity.	No coagu- lation; lilac col.	Coagulat- ed.	No change.	Coagulat- ed.	Nochange.

* Agglutinated by immune serum in dilutions 1-40 and 1-80. Careful seedings of the material from both the subdural and the extradural

From the pus in the intracranial abscess is isolated an organism in pure culture which is similar in every respect to that isolated from the hæmatoma of the scalp. A blood culture was taken on June 28 and an organism isolated in the bile medium corresponding completely with that found in the head.

The microscopic examination of the blood clot shows a slight attempt at organization and a well marked infiltration with polymorphonuclear leucocytes.

The interest in this case lies in the fact that here we had a patient who was undoubtedly suffering from typhoid fever, exhibiting such well marked focal symptoms that it was possible to diagnose a brain lesion which was probably connected with the blow received some weeks before he came to the hospital. But what was the relation between the two? If his cerebral symptoms were due to hæmorrhage why had they been so long delayed? If due to acute encephalitis complicating typhoid fever why were they localized? So far as we could determine there had never been a compound wound and hence direct infection *ab extra* could be excluded.

The result of examination and treatment proved that both these factors had contributed to the condition, viz., the blow caused the blood clot which the typhoid bacillus infected and so an abscess developed. Whether the bacillus was present in the blood at the time of injury or whether the typhoid fever developed subsequently is difficult to say. It is probable that if the injury of one month previous to admission was the cause of the fracture, the invasion of the body by the bacillus typhosus occurred after the injury. There is, however reason for suspecting that a more recent accident must have been the cause of the fracture, especially as the ecchymosis of the eyelids and abrasions of the limbs were suggestive of a more recent injury.

At operation it was thought that, possibly, the fracture extended through the frontal bone into the frontal sinus and

pus collections upon blood serum and agar were made in a series of tubes and in all there was obtained a pure culture of *B. typhosus*.

that by this channel the infecting agent had gained entrance. The bacteriological examination, however, corrected the idea and proved that the infection was through the blood current and not from the frontal sinus.

For permission to publish the clinical notes of this case we are indebted to Drs. Blackader and Elder of the attending staff of the Montreal General Hospital. We wish, also, to thank Dr. Lyman for help in the preparation of the medical notes of the case.

ISOLATED FRACTURE OF THE GREATER TUBEROSITY OF THE HUMERUS.*

BY HENRY LING TAYLOR, M.D.,

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and Hospital.

TRAUMATIC separation of the greater tuberosity of the humerus occasionally occurs as a complication of dislocation of the shoulder, when it may obstruct reduction, predispose to recurrence or lead to prolonged disability. Isolated fracture is considered very rare by the authorities; at least one doubts its existence. The more general use of the X-ray in shoulder injuries will doubtless show that this accident is less infrequent than has been supposed.

It is hoped that the two following observations may aid in clearing up the clinical picture, which is somewhat hazy in the standard works.

CASE I.—On August 16, 1903, a man 46 years old and weighing about 175 pounds, was pitched down three or four steps by the lurching of an ocean steamer, and landed squarely on the front of the tip of the left shoulder. There was total disability in abduction and rotation, soon followed by great swelling of the shoulder and arm and by a large ecchymosis on the outer aspect of the arm extending finally to the dorsum of the hand. The arm was examined about 15 hours later by the ship's surgeon, who found pain on rotation, tenderness over the outer part of the shoulder, but no crepitus and no dislocation; he regarded the injury as a severe contusion, and the arm was carried in a sling for the remainder of the trip with only moderate discomfort except for dressing and undressing, when assistance was required. There was no confinement to bed.

On landing in New York, August 22, 1903, Dr. Forbes Hawkes was consulted and a skiagram was taken, which showed

* Read at the meeting of the American Orthopedic Association, Washington, D. C., May 9, 1907.

FIG. 1.



FIG. 2.



FIG. 3.

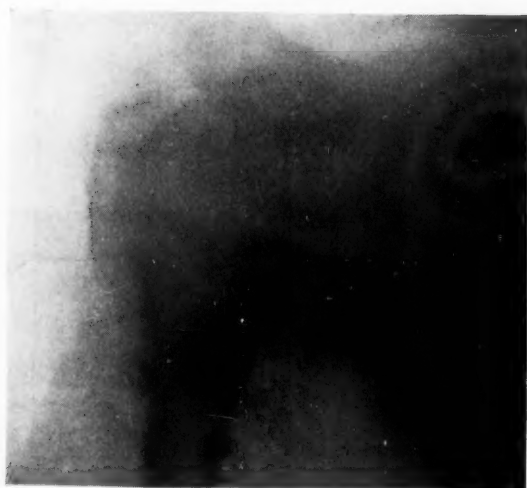


FIG. 4.



complete separation of the greater tuberosity with displacement upward and outward of about a quarter of an inch. The backward displacement which may have existed did not show in the plate. The shoulder and arm were placed in a plaster splint for two days, after which the sling was resumed.

The swelling and ecchymosis slowly disappeared, and without massage or special exercises the function of the shoulder was gradually resumed. A plate taken early in November, 1903, eleven weeks after the accident, showed the tuberosity abnormally prominent and bony union taking place (Fig. 1). About this time the function of the arm was fairly good, and soon after became entirely restored for all ordinary uses. At the present time the patient is conscious of no defect in strength or function, the hand can be placed behind the back and raised vertically above the head, though critical examination reveals some diminution of abduction and external rotation at the shoulder. A skiagram taken March 19, 1907, shows the trochanter-like prominence of the greater tuberosity, which can be easily palpated, and bony fusion with the shaft (Fig. 2).

CASE II.—A stout lady, about 80 years old, on September 25, 1906, fell forward while going down stairs, striking an upright board with the outstretched left hand. There was shoulder disability and much swelling and ecchymosis of the outer and inner side of the arm, a surgeon was called in and a diagnosis of fracture of the upper end of the humerus was made. Ice was applied for a week, and on October 3 the arm and shoulder were put up in a starch bandage. This patient was first seen by the narrator on October 23, 1906, four weeks after the accident. There was a little active and more passive motion at the shoulder, but little abduction or external rotation.

There was tenderness and some prominence of the greater tuberosity, but no crepitus, and the head was in the glenoid cavity. There was much swelling about the shoulder and also about the arm above the elbow particularly on the inner side, and extensive ecchymosis on the outer side reaching below the elbow, and on the inner side to just above the elbow. A skiagram taken October 27, 1906, showed separation of the greater tuberosity of the left humerus with slight upward and outward displacement; backward displacement did not show in the anterior view; there was also a splinter of bone on the inner side of the humeral neck,

which possibly indicated a separation of the lesser tuberosity; union seemed to be taking place (Fig. 3). After a few days the starch splint was discontinued, and the arm supported by a bandage and later by a sling. The vibrator was used to the shoulder and arm muscles two or three times a week for several weeks. Strength and mobility of the shoulder gradually increased, and when the patient was last seen, February 19, 1907, she had very fair use of the arm, which could be abducted without scapular motion to about 60° , and rotated to about 50° . The hand could be raised high above the head, and with some difficulty placed behind the back. The plate taken February 13, 1907, shows prominence of the tuberosity with apparent bony union, and a bony nodule the size of a small pea on the inner side of the neck (Fig. 4).

From these two cases one may conclude that isolated traumatic separation of the greater tuberosity may occur from direct or indirect violence, that the displacement of the fragment may be upward, outward, and backward and very moderate in amount, that early disability at the shoulder, swelling and ecchymosis are prominent symptoms, that crepitus may be absent, that in uncomplicated cases with moderate displacement, splinting in abduction and external rotation, suturing, nailing, and confinement to bed, are unnecessary, that bony union occurs, and that recovery may be practically perfect without splints, massage or special movements.

A CONTRIBUTION TO THE DIAGNOSIS OF RENAL TUBERCULOSIS.

BY R. P. CAMPBELL, M.D.,

OF MONTREAL,

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MUCH interest of recent years has centered in the question of renal tuberculosis. In 1906 it occupied the German Surgical Congress in Berlin, while scarcely a surgeon of genito-urinary note, nor a pathologist, but has expressed himself with reference to the mode of incidence and extension of tuberculosis in the genito-urinary tract. Are we to regard this infection as originating in the kidneys and descending, or as occurring first in the lower part of the tract and ascending to the kidneys? Is it then but a secondary expression of tuberculosis elsewhere, or may it be a primary disease? Can then a nephrectomy offer a reasonable chance of cure or must we be content with internal medication and treatment and look upon such patients as beyond our help? And finally what should be the surgeon's position with regard to tuberculosis of the bladder?

While the position of the surgeon must be that of awaiting more definite proof our present knowledge, in our opinion, demands that he recognize:

First, that tuberculosis of the kidney is a blood infection, rather than an ascending infection from the bladder, etc.

Second, that it may be and often is a primary rather than a secondary manifestation and may affect one kidney, while the other long remains free.

Third, that the only promising treatment is excision.

Fourth, hence early diagnosis is of prime importance.

Fifth, that the cystoscope and ureteral catheter offer us the strongest support, not only in the diagnosis but also in the prognosis, by giving us information as to the physiological or pathological condition of the sister organ and of the bladder, information indeed as to the very presence of the former.

Tuberculosis of the genito-urinary tract was first described early in the last century and was then regarded as an entity; it was not until 1863 that Schmidlein demonstrated that there was a urinary variety (affecting kidney, ureter and bladder) as well as a genital variety, and later Steinthal showed the importance of "primary" urinary or renal tuberculosis.

From a study of the following cases we were forced to conclude, in so far as so small a number will admit of a conclusion, that a focus in the kidney was the commonest origin of genito-urinary tuberculosis and one is not surprised on searching for further evidence on this point to find the unanimity of opinion in this respect. Among continental surgeons Caspar, Kummel, Zuckerkandl, Korteweg, Rovsing, Halle and Motz, Israel, Tuffier, Vigneron, Fenwick in England, Vanderveer and Walker, and others, in America, Ribbert and Adami, among other pathologists, speak for a blood infection of the kidney and a descending infection of the genito-urinary tract. Added to this are the now classic experiments of Baumgarten, later confirmed by Giani, who endeavored by first infecting the bladder, to obtain an ascending infection to the kidneys but without success. While Pels Lenden, by infecting the kidneys equally failed to cause a descending infection of ureter and bladder, Baumgarten, Durand, Fordel, Hauser were able to produce disease of the kidney by infecting it by means of intravenous injections. The late Professor Schede states that it is the general opinion that an ascending infection is also possible, though proof of this is lacking. Where we might have for example a tubercular epididymitis of some standing and a recent tuberculosis of the kidney, affecting chiefly the points of the pyramids, this view might receive support. So far in our experience, however, the incidence of the lesion associated with the renal disease has always occurred after the symptoms of involvement of the kidney have declared themselves.

To prove that a primary hæmatogenous infection of the kidney exists is easier than to prove it the rule. The case described as Case I, which subsequently came to autopsy,

supports the former while as far as clinical facts can be relied upon the remaining cases, with the exception of Case III, support the latter. Here perhaps we should define what we mean by "primary." We have used it in the same sense as we speak of a primary tuberculosis in the lung. This may be a direct infection from the air but the opinion of many pathologists—Ribbert, Adami, Orth, Councilman, Calmette and others—leans more and more to an infection entering through some portal of the digestive tract and thence by lymph stream and blood directly or by first infecting some lymph gland and so indirectly infecting lung or kidney or other organ as the case may be. It is in this sense of an infection, possibly from some unrecognizable source, that we apply the term.

In Case I, the patient after a long illness with early signs of kidney involvement, and at a later date some affection of the epididymis, underwent a nephrectomy and castration. Several months later he died of acute miliary tuberculosis. The autopsy showed all organs equally affected with the miliary type of the disease, but there was no old lesion which could be regarded as the source, either of the present miliary condition or of the former kidney lesion. In other words a primary unilateral tuberculosis had existed.

Such a condition of affairs where one kidney alone is diseased is not one to last for long, sooner or later we must expect either that other organs become affected or a general miliary tuberculosis, and an end similar to that just quoted. Naturally we should expect the pelvis and ureter to be first affected but true tuberculosis of the ureter seems far less common than a sclerosing secondary inflammation. The bladder is early affected (45 per cent.—Israel), while the prostate, seminal vesicles and epididymes may be later attacked. All of which facts urge us to the earliest possible diagnosis and removal of the infected lesion. And in these questions also, with the partial exception of Israel and Kuster who advise (the former) a trial by medication and (the latter) a partial excision, one finds the same unanimity of opinion that the question of primary renal tuberculosis evoked. What, however, has brought

about this unanimity of opinion as to the earliest focus in the genito-urinary tract? Early diagnosis. Formerly we had to rely on post-mortem examinations, where the disease had frequently progressed far enough to have caused the patient's death. Of late we have many surgical cases, diagnosed early, which have shown us that the kidney was principally, or even alone involved; not only so but renal disease is at least frequently unilateral. Vignerot quotes 250 autopsies of renal tuberculosis, 123 of which were one-sided; while of 100 surgical cases but 17 were bilateral. Tuffier of 205 surgical cases found 99 unilateral, and Israel quotes 21 cases, 16 of which he considers primary and unilateral.

The early diagnosis of tuberculosis of the kidney is not easy. Just as is the case with tuberculosis elsewhere the phthisical history, the failing health, the possible evening rise of temperature, point in the right direction and taken in conjunction with local manifestations, such as the occurrence of pus and blood in the urine and symptoms of bladder involvement and enlargement of the kidney, would doubtless lead to a correct conclusion, even without the detection of the tubercle bacilli. It is not, however, in such cases that we can do the most good, but where we can detect the disease before enlargement of the kidney and marked involvement of the bladder has occurred. We say marked, for a moderate involvement of the bladder is not the contraindication we perhaps once thought it. The occurrence of pus or blood in the urine must always raise this possibility before us, but cases exist still more difficult where possibly no symptoms but a pyuria may be present. In all these cases the cystoscope and its accessories may render us valuable aid. Simple cystoscopic examination of the bladder is, as Fenwick has long shown, often invaluable. A close inspection of the ureteral orifices determining the presence of œdema—the “bullous œdema” of Caspar, about the opening, the occurrence of tubercles, later ulceration, and still later displacement of the orifice due to contraction of the ureter secondary to a sclerosing inflammation, are the points of chief interest and may suffice to lead us to a correct conclusion.

Nevertheless where one has gone so far he is scarcely justified not to go further and complete the clinical picture by catheterization of the ureters, difficult as this may be in these cases. The ureteral catheter is not a magic wand, but by it we can glean certain information often of the greatest importance. It furnishes the one certain method of collecting the separate urines and delivering them free from bladder contamination. It gives at the same time information as to the patency of the ureter and frequently as to its dilatation. Naturally we must rely chiefly on a careful examination of the urines so delivered and no means which may give us information in this respect can be neglected. Where possible cryoscopy and the estimation of sugar after the injection of phlorizin should be carried out, but we can support Rovsing who lays chief stress on the specific gravity, the urea determination and proper microscopical examination. It is in short the ureteral catheter rather than the so-called functional diagnosis which has led to the present improvement in renal operative statistics. Of course in some cases the most cursory examination of the urine so obtained suffices; the presence of pus from one kidney, possibly with tubercle bacilli, sets our minds at rest as to the site of the lesion, yet in all instances we should insist on examination of both sides, bilateral catheterization, as only on a comparison of one side with the other can we determine the functional ability of the sister kidney and in many instances it is on this comparison our diagnosis of disease must be made.

Following the hypothesis advanced and elaborated by Caspar that in health both kidneys secrete a urine similar in all particulars, a theory which a large number of cases examined by him amply justifies, and to the correctness of which our own cases lend evidence, and depending on the additional fact that a diseased kidney has its functioning power impaired, a fact also borne out by those accustomed to compare the work of one kidney with its fellow, we are enabled from the difference in the urinary secretion to draw certain conclusions as to the state of the kidney. Let me illustrate a case of, for instance,

movable kidney, where, other diagnoses being possible an examination by catheterization of the ureters was made with the following result:

	COMMON	RIGHT	LEFT
Reaction:	Acid	Acid	Acid
Specific Gravity:	1010	1011	1011
Urea:	.8 per cent.	.8 per cent.	.8 per cent.
Albumin:	0	0	Trace
Microscopical:	Epithelium	Epithelium	Epithelium

Or a case of nephritis:

	COMMON	RIGHT	LEFT
Color:	Clear	Clear	Clear
Reaction:	Acid	Acid	Acid
Specific Gravity:	—	1037	1037
Albumin:	Trace	Trace	Trace
Urea:	—	2 per cent.	1.8 per cent.
Δ	—	-1.8	-1.9
Sugar: (Phlorizin)	—	1.25	1.0
Microscopical:	Hyaline casts		

We are enabled to say in the first instance that the kidneys are normal, and in the second a bilateral lesion of equal severity exists.

The actual values for specific gravity, urea, etc., may scarcely be within normal limits, due perhaps to a patient taking a quantity of fluid immediately before examination. Where however disease exists, as we hope to demonstrate by the following cases, the relation of one side to the other is upset. Even so we are unable to state that the sister organ is absolutely free from disease, but we can state as a result of our examination into its function that it is doing the larger share or it may be the whole of the necessary secretion and presents no sign of disease. It is therefore probably healthy. It has thus been our custom in those cases referred to us to endeavor to reach a correct conclusion by means of the cystoscope and ureteral catheter.

CASE I.—L., aged 38—Dr. G. E. Armstrong—a farmer, complained on February 23, 1906, of pain in the back and the end

of the penis, more especially on micturition and exertion, also of pain and swelling of the left testicle and loss of 30 pounds in weight. The history of his illness began 3 years previously. While working at some heavy labor he was seized with an urgent desire to micturate and experienced some pain in the back. He passed a small amount of blood. The hæmaturia lasted one month, after which he recovered and was "as well as ever" for a further eight months (spring, 1904), when after exposure in cold water the symptoms returned and lasted one and one-half months. He then remained fairly well till March, 1905, when again subsequent to heavy manual labor the bleeding returned to be followed during the summer by some swelling of the left testicle and some cloudiness of his urine. The pain in the back became worse and for some six weeks previous to admission (Feb., 1906) to the Montreal General Hospital, he had been confined to bed.

Such a history pointed to a tubercular condition of the genito-urinary tract but where the lesion was situated and just what hope might be held out to the patient was far from certain. Physical examination showed a pulse rate of 84-104; temperature 99°-100° F.; a swollen nodular left epididymis; some tenderness of both epididymes and of the left seminal vesicle. The urine examination showed the specimen to be acid, specific gravity 1018, a trace of albumin, granular and hyaline casts, and pus in considerable quantity. The kidneys were not palpable. The lungs showed no sign of disease.

A cystoscopic examination showed a slough the size of a finger nail lying in the base of the bladder and a small ulcer about 5 mm. in diameter about the left ureter. The urine from this side was turbid. The ureters were catheterized with the following results:

Right: Clear, mucoid sediment, specific gravity 1009, yellow, albumin (?), urea 1.6 per cent. (blood discs, epithelium), no bacilli.

Left: Turbid purulent sediment, specific gravity 1004, pale, albumin present (large quantity), urea $\frac{1}{2}$ per cent., blood, pus and tubercle bacilli.

Thus we were enabled to make a diagnosis of tuberculosis of the left kidney with slight involvement of the bladder and involvement of the left epididymis. Although the lapse of time since the first appearance of symptoms did not lead us to hope for any brilliant result, yet as the right kidney was in good condition and the

left almost functionless a nephrectomy was performed. A large kidney with well marked tuberculosis of the pelvis and kidney tissue and ureter was removed with but slight alteration in the amount of urine passed in the 24 hours, confirming the belief that the damaged kidney was doing but little work. Subsequently the testis was removed.

The patient recovered fully from the operation but died during the following summer from miliary tuberculosis. The autopsy showed the sister kidney free from any old standing disease, indeed no other old focus was to be found, confirming our opinion that the primary lesion had been in the left kidney. It is interesting to note here the hæmaturia as an initial symptom and the length of time which the disease apparently remained confined to one kidney.

CASE II.—M. B., female aged 29—Dr. J. M. Elder, December 18, 1905—recently emigrated from England, a cotton mill worker, had suffered from pain in the back for six or seven weeks. At first this was dull and trivial but later grew so severe as to cause her to give up her work and seek relief. She had lost some weight but gave no urinary history. On examination she proved to be a poorly nourished woman with a temperature range of 99°–100° and pulse rate as high as 140. Tenderness was present on the right side below the costal margin with dulness to percussion continuous with that of the liver. A mass could be felt in this position. The urine was acid, with a specific gravity of 1015, albumin was present and pus. The condition looked like an ordinary slight pyonephrosis.

The cystoscope showed a well marked cystitis, not tubercular in character, and about the right ureter a small ulcer the size of the head of a lead pencil. From the bottom of this a stream of pus spirts two or three times a minute, not unlike the smoke from the crater of a volcano. Compression of the abdominal mass between the hands causes the stream to increase. The urines were separated by catheters with the following result, 1 c.c. of phlorizin being injected hypodermically one half hour before the examination in order to cause glycosuria.

Right: Acid, specific gravity 1015, albumin present, sugar 0, urea 1.6 per cent., pus in considerable quantity, no tubercle bacilli, many cocci.

Left: Acid, specific gravity —, albumin a trace, sugar present, urea 1.8 per cent., no pus or bacilli.

From this we concluded that the left kidney was healthy, indeed all the phlorizin was secreted by the left although the urea determination showed but slight difference (probably an error) and the right side still had a high specific gravity, due in part however to the large quantity of pus present. From the ulcer about the ureteral orifice we felt that the question of tuberculosis could not be dismissed although no bacilli could be found on careful examination and other infective organisms were present. A tentative diagnosis of tuberculosis of the right kidney was therefore made and a nephrectomy advised and performed.

A large kidney distended with thin pus and with one or two cysts the size of a marble, similarly distended, was the result. Macroscopically no typical tubercular change was present and no bacilli could be found in the scrapings. Microscopically, however, several typical tubercles with giant cells, necrosis, epithelioid cells, and a surrounding zone of small round cells were found, and the clinical diagnosis was confirmed.

No interference with the quantity of urine passed occurred, the quantities for the days following operation being, 18, 17, 20, 14 ounces, practically the same as those immediately preceding, but the quantity rapidly increased to 41, 37, 39, 42 and 32 ounces per diem, a fact frequently seen and due in part to the fact that the absorption of toxic material from the diseased kidney interferes with the normal secretion of its fellow. The patient made an uninterrupted recovery. A cystoscopic examination previous to discharge from hospital showed no ulceration about the ureter and in December, 1906, one year later, the patient was still in good health and examination of the urine and bladder showed these perfectly normal.

CASE III.—T., male, aged 30—Dr. F. G. Finley, October 28, 1905. This patient who was suffering from pulmonary tuberculosis, suddenly developed hæmaturia and an examination was undertaken to prove the nature of the lesion. Both ureters were catheterized and urine collected simultaneously as before. Without going into detail suffice it to say that the right urine was turbid containing a few pus cells and many blood casts; the left was also turbid with many pus cells and a few casts. No bacilli were found in the right but these were present in the left. A diagnosis of bilateral tubercular nephritis was made and no operation performed.

CASE IV.—R., male, aged 35—Dr. G. E. Armstrong, December 24, 1906. This case proved of more than usual interest. The patient had suffered for about six months from frequency and the occurrence of pus and blood in the urine according to his physician's statement. Tubercle bacilli had been reported in the urine but the seat of disease had not been determined and the patient was referred to hospital for further investigation.

The presence of bacilli was confirmed, also the presence of pus and microscopical quantities of blood. The bladder on examination was extremely sensitive, scarcely holding five ounces and one was not surprised on cystoscopic examination to find marked congestion of the surface with the presence of two or three tubercles the size of a pin's head about the trigone and an ulcer 5 mm. in diameter about the orifice of the left ureter. As not infrequently happens, however, in such cases it was extremely difficult to find the orifice of the ureters owing, as Caspar has shown, to the congestion and œdema present. In fact in many instances it is necessary to be guided by the stream of urine issuing from the ureter. After a somewhat prolonged search, however, the right ureter was found but so over-shadowed by the slightly enlarged prostate that its catheterization was impossible. The left ureter was catheterized, being found at the bottom of the ulcer aforementioned, and considerably displaced to the left, owing, as was subsequently proved to the thickened and contracted ureter. The urine from the right kidney was obtained by leaving a catheter in the bladder after thorough washing, while the ureteral catheter was in the left ureter. Compared the one with the other the urines were as follows:

Right: Acid, specific gravity 1025, yellow, mucoid sediment, urea 1.7 per cent., a trace of albumin, Ca. oxalate, a few pus cells, no bacilli.

Left: Neutral, specific gravity 1008, pale, flocculent sediment, urea .3 per cent., albumin present in considerable quantity, pus in quantity and tubercle bacilli.

The left kidney was evidently diseased and as it was doing but a tithe of the work of its fellow, removal was indicated. This was done and a large kidney with a slightly dilated pelvis, with a thickened fibrous ureter, with caseous material in calices extending up into pyramids and tubercles in all stages throughout cortex and medulla resulted. In other words a well advanced

tuberculosis renis. The ureter was in part removed. The bladder was left to take care of itself as in these cases it seems well able to do.

The patient made an uneventful recovery, the quantity of urine per diem being unaltered and all symptoms improving. While it is too early at this date to form any opinion as to the ultimate outcome the prospects are of the brightest and at date of writing, October, 1907, the patient weighs 20 pounds more than at any previous time. The bladder condition is as yet stationary.

CASE V.—W. McK., male aged 22—Dr. G. E. Armstrong, February 9, 1907—complains of frequency for the past eight months. No history of pain, no hæmaturia, no loss of weight. Three weeks previous to observation swelling and tenderness of the left epididymis was observed (no venereal history); this has persisted. On examination the left seminal vesicle was found somewhat indurated, but not tender. The urine showed the presence of pus and tubercle bacilli. Cystoscopic examination revealed a normal urethra, a bladder capacity of 300 cc., the right urethral orifice normal, the left swollen and cedematous; one yellow spot was present just below the meatus and two were to be found in the left side of the bladder high up and several others about the trigone, which is slightly reddened. Pus is to be seen lying in base of bladder. The ureters were catheterized and the urine compared as follows:

	COMMON	RIGHT	LEFT
Reaction:	Acid	Acid	Alkaline
Color:	Pale	Clear	Turbid
Sediment:	Flocculent	Slight flocculent	Flocculent
Specific Gravity:	1015	1017	1013
Urea:	—	2.2 per cent.	1.3 per cent.
Δ :	—	—1.3	—95
Microscopical:	Pus, tubercle bacilli	Epithelial cells no tubercle bacilli	Blood, pus and tubercle bacilli

From this a diagnosis of tuberculosis of the left kidney was readily made. At the same time the interference with the function of this organ as compared with the right was but slight and in consequence the probability was, that but a slight lesion was present. The truth of this interpretation was markedly demon-

strated at operation. On removing the kidney nothing was evident on or beneath the capsule, nor indeed on first sectioning the organ, and it was only after opening up all the calices that one was found, where all the points of the pyramids projecting into it showed macro- and microscopically typical tubercle formation; in fact the point of greatest interest in this case lies in the fact that a lesion affecting so small a portion of kidney tissue could have produced so much interference with its function.

CASE VI.—MCD., male aged 40—Dr. E. M. von Eberts, February 23, 1907. This patient suffered severely from pain in the right side and back incapacitating him from work. Pus was present in the urine and a small hard mass was palpable in the right side of the abdomen. He had lost weight. In consequence he was referred for cystoscopic examination. The left ureter was easily found and catheterized, but the orifice of the right could not be found on two separate examinations, the reason therefor, as evidenced by subsequent events being a sclerosing ureteritis which almost obliterated the lumen of the ureter. Beyond an hypertrophy of the prostate nothing further abnormal was found in the bladder. The urine from the left kidney was obtained by catheter, that from the right by first washing the bladder and leaving a soft rubber catheter in it. The urine thus simultaneously obtained and a common specimen obtained by catheter from the bladder showed:

	COMMON	RIGHT	LEFT
Color:	Turbid	Turbid	—
Specific Gravity:	1025	1010	1018
Reaction:	Acid	Acid	Acid
Albumin:	Present	Present	o
Microscopic:	Pus	Blood cells No pus & pus, no tubercle bacilli	

Evidently the right side was affected.

Taking cognizance of the fact that in tuberculosis the ureteral orifice of the affected side is often masked and displaced, a careful search was continued for tubercle bacilli and finally rewarded by finding these micro-organisms. A nephrectomy was undertaken and a small fibrosed kidney, with large caseous masses throughout, and microscopically typical tubercle formation, removed.

The point of interest here lies in the ureter, which was a thick (size of a 30 F. sound) fibrosed tube, extremely tense, and drawing the kidney down and right side of bladder up, thus accounting for displacement of the orifice, while the extremely small lumen accounted for the difficulty in locating it.

The patient made an uninterrupted recovery from the operation which apparently had no influence on the daily amount of urine excreted. What the ultimate outcome will be of a disease which had evidently been of long standing must be left to the future.

CASE VII.—P. N., male, aged 50—Dr. F. J. Shepherd, October 30, 1906. Two years previous to admission he had noticed blood in the urine. This had recurred on three subsequent occasions. He had also suffered from frequency and pain in the perineum which persisted up to the present. Examination of the urine showed the presence of pus and tubercle bacilli.

A cystoscopic examination was undertaken and the right ureteral orifice found normal. The left meatus was reddened and œdematous and a small slough and ulcer high up on the left side led one to make a diagnosis of tubercular cystitis. The fact, which has lately been emphasized by Walker of Johns Hopkins, that primary tuberculosis of the bladder is extremely rare had not as yet made sufficient impression on me. The right ureter was catheterized but owing to an accident to the other catheter we had to be content to take the left urine through the bladder after a preliminary washing. In comparison of the right, left and common specimens, the latter obtained by catheter immediately previous to examination, the following results were obtained:

	COMMON	RIGHT	LEFT
Color:	Turbid	Clear	Turbid
Specific Gravity:	1025	1027	1025
Albumin:	Present	—	—
Urea:	2.5	2.6	2.3
Microscopic:	Pus and blood, tubercle bacilli	No pus or blood or tubercle bacilli	Tubercle bacilli and blood

It was in consequence of the almost undisturbed function of the left side that a diagnosis of cystitis was adhered to in spite of the small ulcer and œdema near the left meatus, and the patient

was handed over to Dr. von Eberts for observation on his opsonic index and tuberculin treatment.

Under this and hygienic treatment improvement was most marked, the patient gaining weight rapidly and losing his discomfort till in February, 1907, four months later no sign of the former ulcer was evident though some œdema remained and tubercle bacilli could still be found in the urine.

These observations leave no doubt in my own mind that here we had to deal not with a tuberculous cystitis, but with a tuberculous disease of the left kidney and secondary disease of the bladder. The patient continued to improve and hence the question of nephrectomy which would have settled all doubts has never been discussed. The case is of interest in showing the beneficial results of small doses of tuberculin in cases of genito-urinary tuberculosis.

CASE VIII.—Mrs. C., aged 24—Dr. E. M. von Eberts, February 18, 1907. Had been ill about one year with pain in the left loin and pyuria. She had lost some weight and a mass was present in the left side of the abdomen, which was most probably kidney. A cystoscopic examination was undertaken and the right meatus found normal. In place of the left was a large white slough the size of a large pea, which was displaced by the catheter and the mouth of the ureter disclosed. No definite tubercles were evident about this, but it was markedly reddened and slightly ulcerated. In addition a ridge was seen stretching from the left orifice towards the left and giving the appearance which a normal ureter gives when a rather stiff catheter is in place, suggesting that the ureter was under tension. The ureters were catheterized; the right flowed in normal spirts, the left slowly in drops and this was hastened by pressure on the abdominal mass. Examination of the urines showed:

	COMMON	RIGHT	LEFT
Reaction:	Acid	Acid	Acid
Color:	Turbid	Clear	Very turbid
Sediment:	Purulent sed.	No sediment	Purulent sed.
Specific Gravity:	1013	1022	1007
Urea:	1 per cent.	2 per cent.	0.5 per cent.
Albumin:	Trace	Trace	Present
Sugar (Phlorizin):	—	Present	0
Microscopical:	Pus, tubercle bacilli	No pus	Pus and blood, tubercle bacilli, diplobacilli

Consequently we made a diagnosis of tuberculosis of the left kidney and a sound organ on the right. A nephrectomy showed a large caseous kidney with practically no secreting tissue left and many adhesions about it, while the ureter was so tense as to seriously interfere with the removal of the organ. The patient made an uninterrupted recovery and is now apparently in the best of health.

CASE IX.—J. B., female aged 35—Dr. J. M. Elder, September 4, 1907—had not been well for 2 or 3 months but did not consult a physician till a week previous to admission to the hospital, when she experienced a severe attack of pain in the left side accompanied by a chill and sweating. The urine was subsequently dark colored. Five such attacks occurred, two while under observation in the hospital. They caused nausea but no vomiting and were aggravated by exertion. In short the history was that of a renal colic. A loss of weight of some 20 pounds had occurred inside the last year. Three sisters died of pulmonary tuberculosis. The urine contained pus; nothing could be made out on palpation of the abdomen.

A cystoscopic examination showed a normal bladder except for the fact that the right ureteral orifice was much reddened, œdematous and slightly depressed, and about this on close inspection were 2 or 3 tubercle-like spots with a greyish centre. Both ureters were catheterized and the urines examined and compared as follows: (Owing to some error the patient had been allowed to drink copiously before the examination, hence the low specific gravities present.)

	COMMON	RIGHT	LEFT
Reaction:	Acid	Acid	Acid
Specific Gravity:	1002	1007	1008
Sediment:	Slight flocculent sed.	Slight flocculent sed.	Clear
Albumin:	0	Present	Present
Urea:	—	1.2 per cent.	1.5 per cent.
Microscopical:	Pus	Pus	No pus, a few red blood cells

No tubercle bacilli could be found on repeated examination but in spite of this and founded largely on the appearance of the ureteral orifice a diagnosis of tuberculosis was made. A nephrec-

tomy was undertaken and a kidney slightly enlarged with many adhesions about it was removed. About both poles a number of tubercles were to be seen and on section these were also found about the calices of both poles and in the pelvis where a deposit of lime salts had taken place. No doubt a fragment from these deposits had been responsible for the renal colic.

CASE X.—K., male, aged 25, stone-cutter—Drs. F. J. Shepherd and H. A. Lafleur, August 14, 1907. Three months previous to admission patient noticed some pain in the perineum and two weeks later some pain on micturition. This caused him to stop work and seek relief. A perineal abscess was opened and gradually healed. In August, 1907, he was admitted to the hospital for a febricula and on routine examination pus was discovered in his urine. Physical examination was negative.

A cystoscopic examination was made. The right ureteral orifice appeared normal. The left was swollen, reddened and œdematous so that the slightly turbid urine which could be seen issuing from it appeared to come from between small bullæ. Both ureters were catheterized with the following result:

	COMMON	RIGHT	LEFT
Color:	Turbid	Clear	Turbid
Reaction:	Acid	Acid	Alkaline
Albumin:	Present	0	Present
Urea:	2.3 per cent.	4 per cent.	½ per cent.
Δ	—	—2.68	—5
Microscopical:	Pus	Occasional red blood cells, no pus	Pus and a few red blood cells

Repeated examination for tubercle bacilli resulted in showing the presence of 1 or 2 of these. Further evidence was furnished by inoculating a guinea pig which after 25 days showed typical lesions from which the bacilli were recovered.

The nephrectomy performed by Dr. J. F. Shepherd showed a very large kidney with small tubercles at both poles, the centre being free. On section the calices of upper pole were found to be badly ulcerated, the disease extending down on to the wall of the pelvis. The ureter was extremely thickened but did not appear tubercular microscopically.

CASE XI.—H., aged 21, male—Dr. G. E. Armstrong, September 14, 1907. Had had severe attacks of hæmaturia with

slight pain in the left side of the abdomen in front and right side of back for about one year. Had not lost weight. Blood had occasionally been seen in very large quantities. The urine now contains pus. Examination was negative except that the lower pole of the right kidney was palpable.

Phlorizin was administered and a cystoscopic examination made and the ureters catheterized. The urethra and bladder including the ureteral orifices were normal. A comparison of the urines showed:

	COMMON	RIGHT	LEFT
Color:	Turbid	Turbid	Darker
Reaction:	Acid	Neutral	Alkaline
Specific gravity:	1016	1007	1025
Urea:	—	1.1 per cent.	3 per cent.
Albumin:	Present	Present	
Sugar:	—	Present	About twice quantity present in right
Δ	—	— .35	— 1.3
Microscopical:	Pus and tubercle bacilli	Pus, tubercle bacilli	No pus, no tubercle bacilli

Consequently we concluded that the left side was sound, the right tubercular. Nephrectomy showed a condition not unlike that of Case V, viz.: nothing on the outside of the kidney, but one calix, where all the surrounding tissue was tubercular, the disease spreading into the surrounding tissue to a depth of $\frac{3}{16}$ to $\frac{1}{4}$ inch, the whole disease occupying about 9 cc. of kidney tissue. This is another example of the extent to which a slight lesion may influence the function of a kidney. In consequence of removing so much secreting tissue we were not surprised to note a decided diminution in the amount of urine secreted post operation. This, however, rapidly increased to normal.

To Summarize.—Case III is the only case in which symptoms or signs of any other focus of tuberculosis were to be found, if we exclude Cases I, V and VII where an epididymitis occurred some time subsequent to the primary renal symptoms, and Case X where a periurethral abscess was the first sign, though probably secondary to the kidney lesion. As

SYNOPSIS OF CASES.

Case.	Time Elapsed Since First Symptoms.	Earliest Symptoms.	Loss of Weight.	Hematuria.	Pyuria.	Frequency.	Dysuria.	Pain in Back.	Other Organs Affected.	Condition of Bladder.	Tubercle Bacilli.	Operation.	Pathological Report.	Remarks.
I.	3 years.	Hematuria.	+	+	+	..	..	+	Epididymis.	Ulcer about ureteral orifice.	Present.	Nephrectomy.	Macro- and microscopic, positive.	Died later of miliary Tuberculosis.
II.	6-8 weeks.	Pain in back. No urinary complaints.	+	..	+	..	..	+	None.	Ulcer about ureter.	Not found.	Nephrectomy.	Microscopic, positive.	Well 1 year post-operation.
III.	.....	Hematuria.	+	+	..	..	..	..	Lungs.	Normal.	Present.	None.	.....	Secondary to lung disease.
IV.	6 months.	Frequency.	+	+	+	+	+	+	None.	Ulcer about ureter.	Present.	Nephrectomy.	Macro- and microscopic, positive.	Has gained greatly in weight.
V.	8 months.	Frequency.	+	..	+	+	..	..	Epididymis.	Edema about ureter. Tubercle.	Present.	Nephrectomy.	Early tuberculosis.	Has gained greatly in weight. Well.
VI.	.....	Pain in back.	+	..	+	+	+	+	None.	Cystitis. Affected ureter not visible.	Present.	Nephrectomy.	Small fibrosed tubercular kidney.	Gained in weight; pain still present.
VII.	2 years.	Hematuria, pain, Frequency.	+	+	+	+	+	..	Epididymis.	Ulcer and edema of bladder wall.	Present.	None.	.....	Tuberculin injections.
VIII.	1 year.	Pain.	+	..	+	..	..	+	None.	Ulcer about ureter.	Present.	Nephrectomy.	Large caseous kidney.	Very marked improvement.
IX.	3 months.	Pain in side, renal colic.	+	+	+	..	..	+	None.	Edema about ureter.	Not found.	Nephrectomy.	Early tuberculosis.	
X.	3 months.	Pain in perineum.	+	..	+	..	..	..	Periurethral abscess.	Edema about ureter.	Found after inoculation.	Nephrectomy.	Positive.	
XI.	1 year.	Hematuria.	..	+	+	..	..	..	None.	Normal.	Present.	Nephrectomy.	Early tuberculosis.	

far as clinical evidence can be relied on this points to a primary renal tuberculosis. In 9 of the 11 cases tubercle bacilli were discovered in the urine, immediately in 8 and through inoculation in Case X. Two cases were not operated upon, all the remainder were verified micro- and macroscopically. Nephrectomy was the only operation performed.

Post Operation.—Case I in the course of some months developed a miliary tuberculosis and died; Case VI still complained of pain in the back, which possibly indicates some obscure bone focus, otherwise he gained greatly in weight. Case IX developed immediately after operation a pleurisy of the affected side, the nature of which is open to question.

Apart from the examination of the separated urines the cystoscopic examination showing the presence of ulceration, tubercles, or œdema about the ureteral orifices, rendered us valuable assistance.

These cases have so strengthened our belief in the usefulness and accuracy of the cystoscope and ureteral catheter, viewed from a diagnostic standpoint, that we feel justified in going a step further and taking a more hopeful view of this malady. If we can make an early diagnosis of tuberculosis of the kidney and if this may be a unilateral primary disease, as seems often to be the case, then our prognosis should be better than it has been in the past. In the present instance we have purposely refrained from drawing conclusions as to the ultimate prognosis, as some of the cases are still under observation, and we feel that only observation over an extended period can justify such conclusions.

I have only to add my thanks to Drs. Shepherd, Armstrong, Elder, Finley Lafleur and v. Eberts of the Montreal General Hospital for their reference of cases to me and their interest in this work, and to Dr. C. W. Duval for his assistance in the pathological study of the various lesions.

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EXCISION OF THE WHOLE LEFT LOBE OF THE LIVER FOR SARCOMA.

BY GASTON TORRANCE, M.D.,

OF BIRMINGHAM, ALA.,

Surgeon to St. Vincent's and the Hillman Hospitals.

MRS. H. G., age 50, of German parentage, consulted me first on August 16, 1907, on account of a large tumor of the upper abdomen; giving the following history: Her mother died at the age of 65 of "dropsy," family history otherwise negative. Her general health has always been good. Menstruation began at 15 years of age and was regular and normal until she was 20 when she had a fall, after this she menstruated every three weeks; she was married at the age of 24 and continued to have the same menstrual trouble. She has given birth to eighteen children and had five miscarriages, has had twins twice and triplets once; the first child was born one year after she was married and the youngest when she was 45 years old. Nine of the children are still living. Her last menstrual period occurred six weeks ago.

There is no history of syphilis. Her right eye was removed four or five years ago as the result of an injury received ten years previously. Both lobes of her thyroid are considerably enlarged, this was noticed soon after her marriage since which time there has been no marked increase in its size.

Heart and lungs appear to be normal; liver dulness begins at the upper border of the sixth rib and passes downward into the tumor dulness; splenic dulness not increased. Vaginal examination negative except for a slight laceration of the cervix and perineum.

In the abdomen is a mass which lies transversely with the centre of the tumor almost under the navel and apparently adherent to the tissues beneath. She first noticed a small mass in the left side about two years ago, it was freely movable and gave her no trouble; during the past year it has grown very rapidly and interferes with her digestion, probably by pressure; she does not have much discomfort from it now unless she strikes the abdomen. The tumor measures 21 x 13 cm., is firm and rather irregular in outline, the larger end lies towards the left side; it is quite mov-

able and the manipulations do not seem to cause any pain. Blood examination; hemoglobin 80 per cent.; reds 3,712,000; whites 7,000; multinuclears 71 per cent.; mononuclears 23 per cent.; eosinophiles 3.5 per cent.; lymphocytes 2.5 per cent.

Exploration advised. Five days later she was admitted to the private wards at St. Vincent's Hospital. On admission her pulse and temperature were both normal; a specimen of urine was examined and reported negative.

She stated that she had not been able to retain any food in her stomach since she had consulted me five days before and as a consequence was very much exhausted.

The following morning under ether an incision was made through the left rectus beginning just below the border of the ribs and extending down below the umbilicus; the tumor was easily delivered and some strong adhesions to the stomach were found; these were dissected loose and the raw surface of the stomach closed with some fine silk.

After consulting with several members of the staff who happened to be present, I decided to excise the whole tumor; mattress sutures were introduced by means of a blunt pointed liver needle, heavy linen being selected for suture material; after tying off a portion of the liver an incision was made through this part and sutures introduced and tied on the cut surface which almost approximated the peritoneal covering of the liver and completely controlled the hemorrhage; this method of tying and cutting was continued until the whole lobe had been severed; some of the larger vessels spurted and were caught with a Kocher hemostat and a small full curved needle passed through the liver tissue so as to catch them when tied.

The excision part of the operation took about thirty minutes.

The wound was perfectly dry when I had finished and the patient did not lose an ounce of blood in all, not including slightly more than this which regurgitated from the excised portion, but as sutures were introduced in this portion too the hemorrhage was very slight.

The omentum was tucked in around the cut surfaces of the liver and the wound closed without drainage, as practiced by Prof. Garrè in the Breslau Klinik.

The patient's condition was not any worse at the end of the operation than when I began the excision.

FIG. 1.

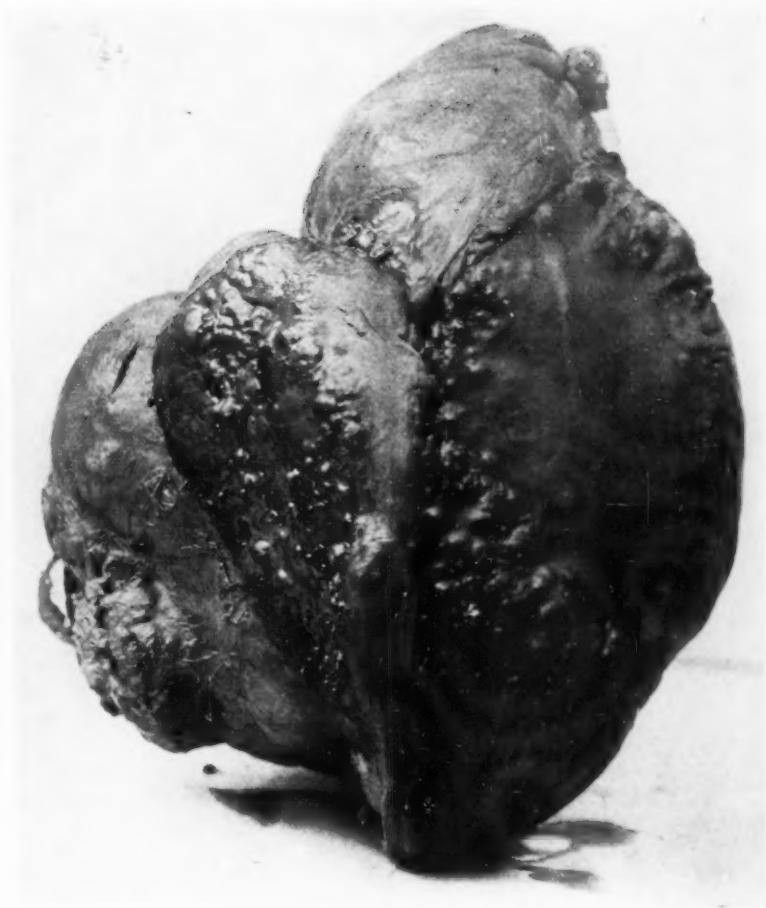


FIG. 2.



Salt solution was given by hypodermoclysis on the table and was continued by enema every three hours. Strychnin and digitalin were given by hypodermic. Her pulse was rapid and continued rapid, but was of fair volume until a few hours before death which occurred twenty-four hours after operation. She was stupid and was aroused with difficulty, perhaps partly due to morphine. The secretion of urine was small and was not much increased by the hypodermic administration of sparteine sulphate. There was a terminal temperature of about 107 F. Unfortunately no post-mortem was allowed.

The tumor weighed two pounds and nine ounces and measured 20 cm. across the upper surface and 43 cm. in circumference; the cut surface, incised from before backwards, measured 12 x 12½ cm. The upper surface showed a large area of thick fibrous tissue and at other places small nodules; the under surface showed a distinct mass which was very much softer and seemed to be cystic and when incised after being in formalin for about ten days, a thick, black, grumous material flowed out leaving a distinct cavity.

The photographs (Figs. 1 and 2) show the cut surface and the extreme left end of the liver.

Pathological report by Dr. C. E. Dowman:

Three blocks of tissue were taken for microscopic examination. They were hardened in 5 per cent. formalin, dehydrated in alcohol and ether and imbedded in celloidin.

Block No. 1 was taken from that portion of the tumor which 'shaded off' into the liver substance. Sections stained with hæmatoxylin and eosin give the following microscopic picture; one-half of the section is composed of somewhat altered liver substance, the lobules being irregularly cut up by strands of fibrous tissue. This fibrous tissue is so extensive in places—as we near the tumor portion of the section—that only here and there are present scattered columns of liver cells, the cells of these columns being considerably compressed. Scattered throughout this portion of the section between the columns of liver cells are numerous deep brown pigment cells. The formation of fibrous tissue increases as we approach the other half of the section. Here we have the picture of broad fibrous tissue bands which form an irregular mesh-work around large alveoli filled with more or less pigmented palely staining spindle and round cells

and large brown-black pigment cells. In most of the alveoli the spindle cells predominate, especially around the edges of the alveoli where they are in close relationship with the connective tissue bands. In other alveoli the formation of the pigment cells has so advanced that the other forms of cells, if they be present, are entirely obscured.

Block No. 2 was taken from a portion of the tumor where the pigmentation was not so pronounced as in most portions. The tissue here consisted macroscopically of very soft, greyish substance which suggested the predominance of cellular elements rather than of fibrous tissue bands. Celloidin sections stained with hæmatoxylin and eosin give the following microscopic picture; the alveolar arrangement described in block 1 is not present. The fibrous tissue bands are also less marked. The field consists chiefly of more or less connected tortuous collections of small and large round cells and spindle cells, whose nuclei take a deep hæmatoxylin stain. Between these tortuous collections of cells are faint strands of connective tissue with here and there scattered groupings of deep brown pigment cells. In one portion of the section the cellular elements have taken more of the eosin and very little of the hæmatoxylin stain, the picture suggesting a necrotic condition. Here the pigment cells are in great numbers. This condition increases as one approaches the edge of the section where the picture consists essentially of large and small, deep brown pigment cells and faintly staining spindle cells.

Block No. 3 was taken through the marked fibrous tissue thickening on the surface of the tumor and extending into the underlying deeply pigmented tumor substance. Sections stained with hæmatoxylin and eosin show microscopically, the thickened outer capsule of the tumor to consist of dense fibrous and elastic tissue. From this capsule, extending downward into the main portion of the tumor, are wide fibrous tissue bands, in the network of which are large irregularly formed alveoli filled with spindle, round and pigment cells as described in block 1. Here the spindle and pigment cells predominate, the former being of all types from the short spindle to the long fibrous cell form, while the latter are brown-black round cells, of various sizes and grouped in great density between the various collections of spindle cells.

Diagnosis.—Melanotic sarcoma, probably metastatic.

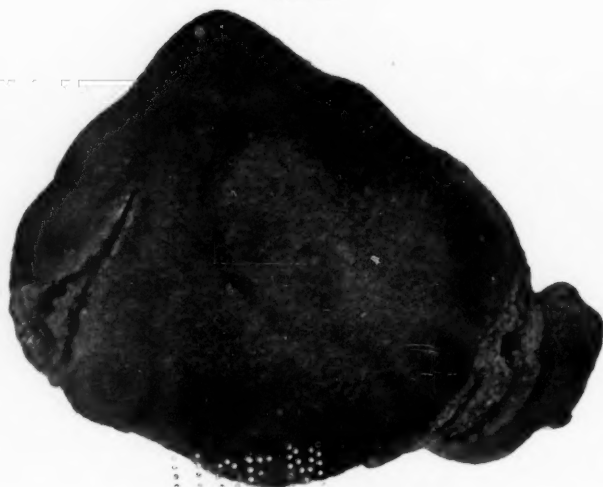
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FIG. 1.



Lacerated spleen, inner surface.

FIG. 2.



Lacerated spleen, outer surface.

SPLENECTOMY FOR LACERATED SPLEEN, AFTER BLOOD TRANSFUSION.

BY ARTHUR H. BOGART, M.D.,

OF BROOKLYN, N. Y.,

Surgeon to the Methodist Episcopal and to the Kings County Hospitals.

G. S., aged 8 years, was admitted to the Methodist Episcopal Hospital with a history of having been run over by a truck. Upon admission, he was found to be in a condition of profound shock, but still conscious and complaining of severe abdominal pain. His temperature was 96° F.; pulse imperceptible at the wrist; respiration 40 and shallow. Heart sounds rapid and feeble. The skin and mucous membranes were pale and cold; the superficial veins over the upper portion of the body markedly dilated.

Examination revealed an extensive ecchymosis over the left tenth rib in the post axillary line. The abdomen was tender, rigid, and dull on percussion in both flanks, but the condition of general profound depression was so marked as to negative for the time any operative interference. Dr. Crile of Cleveland, was visiting the hospital at the time the boy was brought in and who saw the case with the writer, considered it a favorable one for transfusion, and very kindly consented to demonstrate his method. The mother of the patient was secured as the donor, and at the end of thirty-eight minutes the patient's pulse had dropped from 140 to 110 and had increased in force and volume, his color had improved and his general condition became such as to warrant an exploratory abdominal incision, which was made.

Upon opening the abdomen it was found to contain considerable free blood, due to a lacerated spleen (see plate, Figs. 1 and 2), the pedicle of which was ligated, and the organ removed, the cavity was then sponged out and the wound rapidly closed with through-and-through sutures of silkworm gut.

The patient bore the operation well, his condition being quite as satisfactory at its conclusion as when it was begun. He began to sink rapidly, however, and died three and a half hours later. At the post-mortem examination there was found an extensive retroperitoneal hemorrhage due to a rupture of the left renal vein and several small lacerations of the liver.

SPLENECTOMY FOR GUNSHOT WOUND OF THE SPLEEN.

BY EDWIN H. FISKE, M.D.,

OF BROOKLYN, N. Y.,

Assistant Surgeon to the Kings County Hospital.

R. B., aged 25 years, a bartender by occupation, was admitted to Kings County Hospital at 6.30 P.M. August 28, 1907, with the following history: One hour before admission to hospital, patient was shot in the back, during an altercation. Examination showed a wound about $\frac{3}{8}$ inch in diameter, in left posterior axillary line, at tenth intercostal space.

General condition fair, conscious, but restless; face somewhat blanched, expression anxious; respirations rapid, but regular; 26 per minute. Conjunctivæ slightly pale, mucous membranes likewise anæmic, though not markedly so. He complained only of pain beginning posteriorly over subscapular region, and extending into left epigastric and left hypochondriac regions. Pulse 108, regular, of only fair volume. Temperature 99° F. Heart and lungs negative; no dulness at base of left lung, respiratory sounds normal.

Abdomen somewhat distended; tenderness general, but marked in left epigastric and particularly so on deep pressure under chondral borders over splenic area; slight rigidity of left rectus; no tumefaction. Percussion showed flatness in left lumbar region in recumbent position; in lateral recumbent flatness gave place to tympany. During examination patient complained of thirst, and pulse increased to 115, and seemed of less volume.

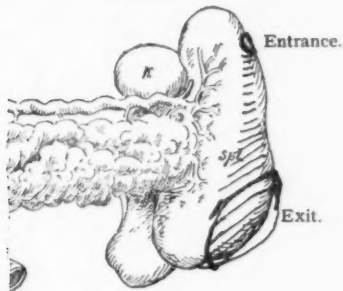
A diagnosis of intra-abdominal hemorrhage, with possible splenic injury was made; the patient was quickly prepared for operation and brought to operating room.

Operation.—Dr. Fiske, assisted by Dr. Canna and house staff. Under ether narcosis, with large pointed probe, the wound of entrance was probed; the course was directed downward and forward and inward to upper border of eleventh rib, where the probe was arrested and not pursued further.

An incision over outer border of left rectus was made, extending from costal margin down to a point midway between

umbilicus and symphysis. On opening peritoneum about one pint and a half of blood escaped, followed by several small clots, but without gas, fæces, or gastric contents; the stomach and intestines were carefully examined without result, excepting a punctured wound of transverse mesocolon, a short distance (1 inch) from gut. This wound was repaired and as blood continued to well up, the spleen was rendered more accessible by a transverse incision running outward at right angle to the one parallel to outer border of rectus, from about its centre. The hand was then able to grasp the spleen in which a wound admitting two (2) fingers could be felt. It was impossible to expose spleen to field of vision because of incomplete anæsthesia and intestinal disten-

FIG. 1.



Showing course of bullet through spleen entering above, emerging below. Extensive destruction of splenic substance.

tion. The ligaments of spleen were separated by dissection with fingers, and spleen brought up into wound; it was now evident that the injury was one necessitating removal of the organ. The pedicle was ligated en masse, being previously clamped; and the spleen then removed. The individual vessels in the pedicle were ligated separately. Bleeding having ceased, the stump was returned to the cavity and the abdomen flushed with normal saline solution; a small iodoform drain was inserted down to the pedicle, and the wound closed by through-and-through silkworm gut sutures excepting at the upper end where only enough space was left to allow the exit of the drain.

The patient was given 1 pint of normal saline solution, containing oz.i of sol. adrenalin intravenously, the wound dressed and patient returned to the ward in good condition.

On the following day the patient complained of slight pain

in the operative region, no other abdominal tenderness, no rigidity, no vomiting. Pulse 115, but of good volume; temperature 100; respiration 30.

Patient made thereafter an uneventful recovery. On September 2nd the drain was removed; the wound was clean, and the dressings were reapplied without drain.

September 5th, several stitches removed; wound healed primarily.

September 7th, all sutures removed.

September 11th, patient out of bed.

September 22nd, patient left hospital, completely recovered.

Radiograph taken shortly before discharge from hospital, showed the bullet in the pelvis.

SPLENECTOMY IN BANTI'S DISEASE

WITH REPORT OF A CASE.*

BY GASTON TORRANCE, M.D.,

OF BIRMINGHAM, ALA.

Surgeon to St. Vincent's and the Hillman Hospitals.

BANTI, the Italian pathologist, first described in 1882 the syndrome which bears his name. The spleen becomes enlarged without known cause; is firmer than normal but still preserves its normal contour. A progressive anæmia develops later with occasional periods of remission. The skin becomes bronzed or pigmented with some jaundice. This may be called the first stage and in some cases lasts from 3 to 10 years or longer.

The second stage may last only a few months; the urine becomes scanty, high colored, loaded with urates and contains urobilin.

In the third stage we have ascites with Laennec's cirrhosis.

Etiology.—Barr says it is probably due to a vaso-motor paresis of the splanchnic area, either in whole or in part, arising from disease of the visceral sympathetic ganglia. As a consequence there is a great engorgement of the abdominal viscera; and especially the spleen and the liver; and increased hemolysis with consequent oligochromemia and oligocythemia. The increased blood supply to these organs leads to fibrosis and lessened function. The peritoneal effusion is due rather to vascularity than to portal obstruction.

Harris and Herzog think the enlarged spleen is responsible for the destruction of the red cells and advance the theory that there is an erythrolytic enzyme secreted by the increased numbers of endothelial cells found in these spleens and feel that this view is substantiated by the fact that there is an immediate improvement in the blood picture after removal of the spleen.

* Read before the Section on Surgery of The Southern Medical Association, September 24, 1907.

Symptoms.—Cardiac palpitation on exertion with a feeling of unusual muscular fatigue may be the first symptoms noticed. There may be headache and slight pallor of the mucous membrane. After a few months the patient's attention is attracted by a tumor in the left hypochondriac region and there may be a sense of weight or tension. Soon afterwards nausea and vomiting and at times a persistent diarrhoea may occur.

Headache and dizziness may be troublesome. Epistaxis is a common early symptom. There may be cutaneous hemorrhages or bleeding from the gums or other mucous membranes. There is a progressive anæmia with pigmentation or bronzing of the skin and some jaundice.

Abdominal pain with distension of the stomach and bowels, dyspnœa dysuria, cramps in the legs, etc., are common symptoms.

Pathology.—The normal spleen weighs 200 grammes and measures $12 \times 8 \times 3$ cm. The changes in the spleen are fairly uniform and consist in great enlargement, sclerosis of the capsule and reticulum, sclerosis and atrophy of the Malpighian corpuscles (a marked point of differentiation from leukæmia, in which the Malpighian bodies are increased—Cabot), and atrophy of the pulp. In other cases the normal texture is largely replaced by fibrous tissue and large endothelial cells, with clear protoplasm, containing two or more nuclei. The splenic veins are markedly sclerosed.

The lymph glands are as a rule not enlarged. There is usually an increase in the marrow of the long bones; in some cases it is fatty and in others there is a red atrophy.

The liver shows slight increase in its interlobular connective tissue. Infiltration of round cells is observed about the portal vessels and between the lobules. Banti has reported a case in which there was considerable increase in the connective tissue, which he described as a perilobular hepatitis.

The Blood.—The coagulability is much reduced. The red cells are as a rule reduced, ranging from 4,000,000 to 568,000. The corpuscles are pale. Neucleated reds have not

been found. Rouleaux formation is absent in the later stages. The hæmoglobin is reduced. The white cells are not increased as a rule. The relation of the different forms is not disturbed. No abnormal elements have been recorded. A few cases have been reported in which there was a leucocytosis. The color index is lowered.

CASE I.—SPENCER WELLS, in 1865, operated upon a woman 34 years of age, who had a marked anæmia with slight increase of the whites, resulting fatally. The spleen weighed 2672 grammes.

CASE II.—PEAN, in 1876, removed the spleen of a woman 24 years of age. She first noticed the tumor eighteen months and the anæmia six months previously. The anæmia progressed steadily. There was great disturbance of digestion, severe neuralgic pains, hæmoptysis, hæmatemesis, hæmaturia, and bloody stools. No leucocytosis. The spleen weighed 1125 grammes. The patient recovered perfectly in a month's time but died later of a toxic enteritis.

CASE III.—CZERNY, in 1878, removed a large spleen from a woman 34 years of age. She was anæmic, had digestive and menstrual disturbance and her general health was poor. No leucocytosis. Spleen measured 23 x 12 x 8 cm. She made a complete recovery.

CASE IV.—FRANZOLINI, in 1881, operated upon a woman 22 years of age, removing a spleen weighing 1526 grammes, with a complete recovery. Her health had never been good; she had suffered from edema and ascites at 12 years of age, from which she recovered. She began to have pain in the region of the spleen two years before operation. Her suffering and anæmia increased. There was great muscular fatigue and obstinate vomiting. Leucocytosis was increased five times the normal. After operation her suffering ceased and a month later the whites were reduced to one-half the number found at the time of operation. This case was reported as a leukæmia but was not so considered by Banti and Sippy.

CASE V.—FRASCANI removed the spleen of a girl 16 years of age resulting fatally in four hours from hemorrhage. She had noticed the tumor two years before and during this time had occasional attacks of epistaxis, fever and diarrhœa. The anæmia was

noticed one year later and was marked at the time of operation. There was also edema and ascites. Hæmoglobin 68 per cent., reds 3,900,000, whites 7,030. Some glandular enlargement. The spleen weighed 1310 and the liver 1050 grammes.

CASE VI.—In 1892 LINDFORS removed the spleen of a female 22 years of age who had noticed a tumor five years before. She was quite anæmic. Red corpuscles much reduced and the hæmoglobin markedly so. The relation of the white corpuscles to the reds 1 to 250. The spleen measured 25 x 15 x 7 cm. The patient recovered.

CASE VII.—CECI, in 1893, removed the spleen of a girl 13 years of age with recovery. Her trouble began two years before with anæmia and tendency to hemorrhages from the gums. She was quite thin with muscular weakness. Hæmoglobin 65 per cent.; reds 3,592,000; whites 15,000. Weight of spleen 1300 grammes.

CASE VIII.—COLZI operated upon a woman who died several days afterwards from a septic puerperal complication.

CASE IX.—COLZI operated upon a young man who was in perfect health nearly three years afterwards.

CASE X.—COLZI's third case was a woman who was reported in good health nearly two years after operation. No anæmia.

CASE XI.—PICOU and RAYMOND in 1896 reported the case of a woman 32 years of age who had menorrhagia for a year and the enlarged spleen was mistaken for a uterine fibroid. The other symptoms were vague abdominal pains extending into the lower extremities, swollen and bleeding gums, some digestive disturbance and edema of the ankles. The blood changes were those found in simple anæmia. Weight of spleen 2800 grammes; measurements 26.5 x 14.2 x 9 cm.

CASE XII.—CUSHING in 1898 removed the spleen of a man 33 years of age. He made a good recovery and gained 30 pounds in weight. He was reported living and well eight years later with no return of the hemorrhages.

CASE XIII.—HALSTED in 1898 operated upon a case reported by Osler; the patient was a man, 33 years of age, whose trouble began ten years before. He had hæmatemesis and bloody stools. Hæmoglobin only 25 per cent.; reds 3,000,000 and whites 2,800; multinuclears 84.4 per cent.; large and small mononuclears 9.4 per cent.; transitionals 3 per cent.; eosinophiles 2.8 per cent. He

made a good recovery and continued well when heard from a year later.

CASE XIV.—D'ARCEY POWER operated upon a woman 43 years of age in 1899. Three and a half years previous to this time she had struck her side over the region of the spleen; two years later she noticed that the lower part of her abdomen was increasing in size. When operated upon the spleen was found to be suspended by a pedicle four inches long made up of fatty connective tissue with enlarged veins and splenic artery. The spleen weighed 17 to 18 ounces after having been in alcohol for six months. Blood examination made eight days after operation showed reds 4,230,000; whites 17,000; polynuclears 65.5 per cent.; lymphocytes 18.75 per cent.; large mononuclears 12.5 per cent.; eosinophiles 3.5 per cent. She made a good recovery.

CASE XV.—BOVAIRD'S case operated upon by A. J. McCosh in May, 1899, was a girl 16 years of age. Thirteen years before her mother had noticed an enlargement of the abdomen which had steadily increased. Her face and hands became deeply bronzed. Blood examination at this time showed reds 3,550,000; whites 7,000; large lymphocytes 15 per cent. normal 4-8 per cent.; small lymphocytes 21 per cent. normal 35 per cent.; multinuclears 62 per cent. normal 62-70 per cent.; eosinophiles 1.4 per cent. normal $\frac{1}{2}$ -4 per cent. Weight of spleen $2\frac{1}{2}$ pounds. The patient died three hours after operation.

CASE XVI.—HARRIS and HERZOG report a case operated upon in May, 1899. The patient was a female 22 years of age; when eleven years old she fell from a swing; she was in good health for two years when she began to have some discomfort about the stomach and accidentally discovered a tumor in the left side of the abdomen. Six months later she had an illness with severe hæmatemesis, abdominal distension and fever lasting three months. Two and a half years later had another hemorrhage from the stomach. Menstruation began at 17 and was regular and normal. From this time on her health became gradually worse. Three months before operation she had a severe illness with marked pain in the upper part of the spleen with abdominal distension and it is very probable that an infarct which was found in the spleen at operation, occurred at this time. A brownish pigmentation of the skin was found and especially of the face, neck and arms and abdomen. Hæmoglobin 40 per cent.; reds

2,631,000; whites 2650; at end of 2nd day 15,000, 3rd day 11,560, 17th day 5,688 Eosinophiles at the end of 7th month 14.4 per cent.; 20th month 11.4 per cent. The urea was increased about 4 grammes daily after operation. Temperature 103.8 F. on the third day and ranged from 99 to 102 for two weeks. She gained 25 pounds in three months and went back to work. She had a return of the gastric symptoms about four months after operation but made a good recovery and was in good health about two years after operation and the skin was clearing up. Weight of spleen 1055 grammes. Measurements $21 \times 13.5 \times 7$ cm.

CASE XVII.—NANCREDE operated upon a man 41 years of age in November, 1899. The portal vein was found to be partially closed by a fibrous valve containing calcarious plates. The splenic and mesenteric veins were very much distended and their walls much thickened. Weight of spleen 1536 grammes. The patient did not recover.

CASE XVIII.—HARRIS and HERZOG operated upon a man 47 years of age in September, 1900. Nine months previous to this time he began to have pain in the umbilical and epigastric regions with loss of weight, 30 or 40 pounds. The skin was of a dirty yellow color but there was no pigmentation. Spleen much enlarged but there was no enlargement of the liver or glands. Hæmoglobin 50 per cent.; reds 3,364,000; whites 28,200; color index 0.74. There was an increase of polynuclears; no plasmodia. Three weeks after operation: hæmoglobin $62\frac{1}{2}$ per cent.; whites had decreased 4,000. No increase of eosinophiles. Weight of spleen after having been hardened in formalin 600 grammes. Measurements $18 \times 12 \times 6$ cm. He made a good recovery and was doing well when heard from last and was attending to business.

CASE XIX.—J. COLLINS WARREN removed the spleen of a man 26 years of age in 1900. Two years previous to this time he began to have diarrhoea and suffered with distress after eating and vomiting. He improved under treatment but had a recurrence every few months. About a year later he noticed a tumor in the left side about the size of a grape fruit. He lost weight and at the time of operation had dyspnoea on exertion and was unable to attend to his business. Hæmoglobin 65 per cent.; reds 5,200,000; whites 2,200; multinuclears 70 per cent.; lymphocytes 22 per cent.; eosinophiles 3 per cent.; megaloblasts .07 per cent.; normo-

blasts .01 per cent. Two days after operation the whites increased to 24,000. Weight of spleen 1155 grammes. Measurements 21 x 16 x 8 cm. He made a good recovery and is reported perfectly well and attending to business six and a half years later.

CASE XX.—JAFFÉ reports a successful case in 1900 operated upon in the last stages with an enormous amount of ascites. The liver was found to be cirrhotic and he suggests that Talma's operation should be done at the same time. There was a wonderful improvement in the patient's condition notwithstanding the cirrhosis of the liver.

CASE XXI.—TSCHERNIACHOWSKI reports the case of a female aged 25 years in whom the splenic enlargement had been diagnosed essential hypertrophy and had existed 2 years, increasing in size and the patient losing strength, in spite of all treatment. There was a complete recovery.

CASE XXII.—CUSHING operated upon a man 38 years of age in 1900, who died ten days later from the rupture of an œsophageal varix.

CASES XXIII and XXIV.—ARMSTRONG quotes two cases operated upon by Mayo. Both recovered; one was living nine months after operation and the other died a year later, cause of death not given.

CASE XXV.—W. S. HALSTED in 1901 operated upon a man 30 years of age; the patient died of hemorrhage on the table.

CASE XXVI.—BEVAN's patient died from hemorrhage and shock a few hours after operation. Large calcareous plaques were found around the spleen and especially between it and the diaphragm with numerous adhesions.

CASE XXVII.—GORDON removed the spleen of a man 45 years of age, in June, 1902, weighing 3635 grammes, with recovery. He was reported to be in perfect health seven months later and had gained 28 pounds. Hæmoglobin 85 per cent.; reds 4,000,000; whites 6,600.

CASE XXVIII.—JONAS operated upon a man 39 years of age, in 1902, who had first noticed an enlargement of the left side six months before. There was no impairment of digestion. Some large veins were noticed on the left side of the abdomen. No hemorrhages. The liver extended about two inches below the border of the ribs. There was a bronzed condition of the skin of the chest, back, abdomen, and parts of the thighs. No pig-

mentation. Hæmoglobin 60 per cent.; reds 4,500,000; whites 25,000. Some accessory spleens were found at the operation and were left. The fresh spleen weighed $7\frac{3}{4}$ pounds. Measurements $18\frac{3}{4} \times 12\frac{3}{4} \times 8\frac{1}{2}$ inches. Infarcts varying from the size of a pea to a walnut were found. The patient made an uninterrupted recovery and was reported well two years later.

CASE XXIX.—CLARKE in January, 1904, removed the spleen of a *colored* woman 21 years of age, weighing 1230 grammes. Armstrong quotes a letter from Dr. Stengel dated July, 1906, in which he says she is quite well and that her condition is practically normal.

CASE XXX.—LESPEYRES operated upon a female 32 years of age, in 1904, with recovery. Some cachexia and anæmia persisted five months later.

CASE XXXI.—HART removed the spleen of a boy 14 years of age in 1904. He made a good recovery and was reported perfectly well two years later and able to run an automobile, swim and row.

CASE XXXII.—KÖNIG, in February, 1904, removed the spleen of a boy 15 years of age which weighed 1300 grammes. The jaundice had almost disappeared in twelve days and the liver which was much enlarged at the time of operation seemed normal at the end of three weeks.

CASE XXXIII.—HARRIS removed the spleen of a man 60 years of age in April, 1906. He died a few hours after operation. There was great enlargement of the splenic veins.

CASE XXXIV.—G. E. ARMSTRONG of Montreal, in January, 1906, operated upon a man 26 years of age who five years previously was struck by the elbow of a companion in the region of the spleen and afterwards vomited some dark material. Tenderness persisted for ten days and the spleen became enlarged. He was examined by Dr. Osler two years later and he found some enlargement of the left lobe of the liver and considered it a case in the early stages of Banti's disease. Blood examination at this time; hæmoglobin 90 per cent.; reds 4,700,000; whites 5,000; multinuclears 80 per cent.; large and small mononuclears 15 per cent.; eosinophiles 2 per cent.; transitionals 3 per cent.

Dr. Stengel saw him about two months before operation and considered it a case of Banti's disease and advised splenectomy. He had been slightly jaundiced for some months and had consid-

erable digestive disturbance. Weight of spleen 1000 grammes. Measurements 22 x 13 x 8 cm. He was reported in perfect health nine months after operation with normal blood count and no appreciable alteration in the size of the liver.

CASE XXXV.—W. P. CARR operated upon a man 49 years of age in July, 1906, with great enlargement of the spleen and slight enlargement of the liver. His health had not been good for a number of years and he had lost considerably in weight. About eighteen months previously he had fallen and struck his abdomen over the region of the spleen, on the end gate of a wagon and was unable to turn himself in bed for six weeks. Has had severe diarrhœa but no hemorrhages. No blood examinations were made. Microscopically the spleen showed increase of connective tissue and Malpighian bodies. He made a good recovery and was reported in good health several months later with no return of the diarrhœa.

CASE XXXVI.—Author's case was operated upon in February, 1907. The patient was a female 35 years of age, the mother of five children. Her general health has always been good. No history of malaria or syphilis. For the past year has had more or less digestive trouble, some nausea, considerable gas distension of the stomach and bowels. Bowels constipated. The symptoms that first attracted her attention were headache, pain in the back and in the left side—there has been a sense of weight and dragging in this region. The tumor was first noticed about nine months ago. She was being treated for kidney "trouble." There has been considerable muscular weakness and she has been unable to attend to her household affairs with any degree of comfort and is scarcely able to go up town. No hemorrhages. Slight enlargement of the liver. The splenic dulness extends from the upper border of the ninth rib down almost to the crest of the ilium. The spleen cannot be felt through the vagina. Some tenderness in the region of the spleen. Skin has a yellow dirty color slightly bronzed. The urine was negative except for a slight bile reaction and high specific gravity. As there was some question about the tumor being the spleen the urine was segregated and both kidneys found to be functioning normally and about equally. Sahli's Iodoform Glutoid Kapsulen was given to test the function of the pancreas.

Blood examination: Hæmoglobin 85 per cent.; reds 4,800,-

000; whites 8,000; multinuclears 75 per cent.; lymphocytes 20 per cent.; large mononuclears 4 per cent.; transitionals 1 per cent. Under ether an incision was made beginning at the lower border of the twelfth rib and running down in front of the anterior superior spine of the ilium; the kidney was found to be in its normal position and the peritoneum was opened and the spleen found to have some adhesions anteriorly which were divided between ligatures and the spleen delivered and the pedicle tied with a heavy linen ligature, a portion of the spleen tissue was left to prevent the slipping of the ligatures. There was no hemorrhage and the wound was closed in tiers with heavy chromic cat gut. The wound healed kindly and she had no discomfort for two weeks when she began to complain of pain in the abdomen and legs. Her pulse became more rapid and her temperature ran up from normal to 101.4 F. and she seemed to be rather weaker. She was immediately put on extract of red bone marrow and in the absence of any extract of spleen the fresh spleens of the cow and sheep were given twice daily. Later we gave Armour's extract of spleen three grains after meals. Her temperature was normal in about a week and the pains in her abdomen and legs had about disappeared.

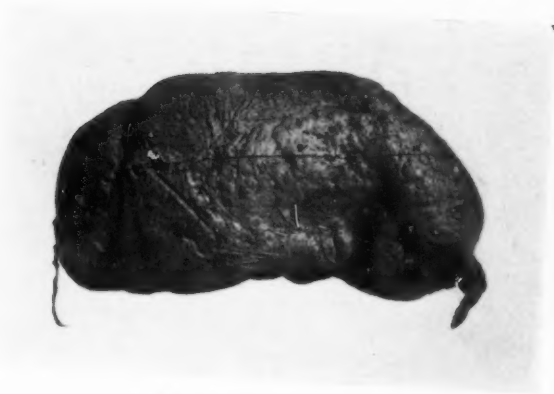
The extract of spleen was kept up for a month or six weeks. Blood count three weeks after operation: hæmoglobin 80 per cent.; reds 3,246,000; whites 6,000; multinuclears 76 per cent.; large mononuclears 11 per cent.; transitionals 9 per cent.; eosinophiles 4 per cent. Her digestion soon became normal and she has not been troubled with the flatulence any more.

Her skin has cleared up and she seems to be perfectly well and normal and has gained 15 or 20 pounds and is probably pregnant now, seven months after operation.

The spleen measures 15 x 8 x 7 cm. There is a large fibrous growth involving about three-fourths of the capsule on the outer surface and in places is almost a centimeter in thickness as shown in the photograph (Figs. 1 and 2). On section this part was very hard and the spleen tissue seemed harder to cut than in a normal spleen.

Dr. Jas. S. McLester gives the following pathological report: A specimen of tissue from the spleen which you sent was frozen for sectioning, fixed in formalin and stained in hæmatoxylin-eosin, and presents the following:

FIG. 1.



Enlarged spleen removed.

FIG. 2.



Enlarged spleen sectioned.

1700

The capsule is greatly thickened, being in places fully a half centimeter in thickness. Throughout the entire organ is seen a pronounced increase of fibrous tissue; the trabeculæ are thickened throughout and the Malpighian bodies are smaller than normal; they also show an increase of the fibrous tissue.

No proliferation of the endothelial cells is seen.

The blood vessels are larger and more numerous than in the normal organ.

TABLE OF CASES REPORTED UP TO THIS TIME.

Date	No.	Operator	Sex	Age	Result
1865	1	Spencer Wells	F.	34	Death
1876	2	Peau	F.	24	Recovery
1878	3	Czerny	F.	34	"
1881	4	Franzolini	F.	22	"
—	5	Frascani	F.	16	Death
1892	6	Lindfors	F.	22	Recovery
1893	7	Ceci	F.	13	"
—	8	Colzi	F.	—	Death
—	9	Colzi	M.	young	Recovery
—	10	Colzi	F.	—	"
1896	11	Picou and Raymond	F.	32	"
1898	12	Cushing	M.	33	"
1898	13	Halsted (Osler's case)	M.	33	"
1899	14	D'Arcey Power	F.	43	"
1899	15	McCosh (Bovaird's case)	F.	16	Death
1899	16	Harris and Herzog	F.	22	Recovery
1899	17	Nancrede	M.	41	Death
1900	18	Harris and Herzog	M.	47	Recovery
1900	19	J. Collins Warren	M.	26	"
1900	20	Jaffé	—	—	"
—	21	Tscherniachowski	F.	25	"
1900	22	Cushing	M.	38	Death
—	23	Mayo	—	—	Recovery
—	24	Mayo	—	—	"
1901	25	Halsted	M.	30	Death
—	26	Bevan	—	—	"
1902	27	Gordon	M.	45	Recovery
1902	28	Jonas	M.	39	"
1904	29	Clarke (colored patient)	F.	21	"
1904	30	Lespeyres	F.	32	"
"	31	Hart	M.	14	"
"	32	König	M.	15	"
1906	33	Harris	M.	60	Death
"	34	Armstrong	M.	26	Recovery
"	35	Carr	M.	49	"
1907	36	Torrance	F.	35	"

Analysis of Cases.—Of the thirty-six cases reported above 9 died, a mortality of 25 per cent.; 17 or 47 per cent. were females; 15 or 42 per cent. were males; in 4 or 11 per cent. the sex was not given: Under 20 years of age 5 or 13.9 per cent.; between 20 and 40 years 18 or 50 per cent.; between 40 and 60 years 6 or 16.6 per cent.; age not given 7 or 19.5 per cent. Total 36 or 100 per cent.

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SPLENECTOMY FOR CARCINOMA.

BY MARY ALMIRA SMITH, M.D.,

OF BOSTON, MASS.

CANCER of the spleen is of such rare occurrence, that it would seem desirable to place every case on record, especially if an operation be performed.

The task of looking up the bibliography of this subject has been greatly lightened by use of the very thorough record of splenectomies done for all causes, both in this and foreign countries, compiled by Dr. J. H. Carstens, of Detroit, whose monograph appeared in 1905. Among over 700 cases, he found only 25 operations for malignant growths, of which 22 were for sarcoma, and 3 for carcinoma.

Since January 1, 1905, I can find only one splenectomy for malignant growth recorded, and that a sarcoma, so that the case I am about to relate appears to be the fourth splenectomy for carcinoma on record.

Mrs. F. W., American, 49 years old. Nothing of special note in either the family or personal history. Married in 1894. One child, born fifteen months later. After confinement the abdomen did not return to its natural size, and patient complained of a "dragging sensation," and became easily fatigued.

In May, 1897, she first noticed a tumor in the abdomen, which increased rapidly in size during the next three months and became very sensitive. This led to her consulting me in August, 1897. A diagnosis was made of multilocular right ovarian cyst, and an operation was performed August 21, 1897. Immediately upon opening the peritoneum, there gushed forth a considerable quantity of a transparent, gelatinous fluid mixed with shreds of reddish tissue. Then the ovarian cyst was encountered, with the right fallopian tube spread out over it. The cyst wall was very thin and friable, tearing easily. The walls of the septa were partly smooth and partly covered with a proliferating, papillomatous growth. The cavities of the tumor were filled with the same gelatinous fluid, clear and transparent in some, greenish

or dark brown in others. In all nine pints of this colloid material was removed, together with the sac. Upon examination the left ovary and tube were found to be in a beginning stage of the same disease, likewise the vermiform appendix. All were removed. The tip of the appendix was so transparent, that after its removal a probe passed into its lumen was plainly visible. The peritoneum was throughout thickened, and vascular, and it, as well as the uterus and intestines, were profusely studded with a growth resembling wet sago grains. The abdomen was washed out with normal salt solution, and then closed with layer sutures without drainage. The microscopical examination gave a diagnosis of proliferating cyst adenoma of both ovaries of malignant type.

The wound healed by first intention. There was considerable digestive disturbance following the operation, necessitating rectal feeding for a time. Patient left the hospital in thirty-five days, and at home gained slowly but steadily.

In spite of the unfavorable prognosis given, nothing further was heard from the patient till March of this year, ten years later, when she returned complaining of pain in the left side, rapid emaciation, and loss of strength. In January, 1906, she had noticed a lump, size of an egg, in the epigastric region, in connection with some digestive disturbance. Under medication by her local physician the digestion had improved, and not till a year later, January, 1907, did the tumor grow very much, but since then very rapidly. Upon examination I found a large, firm, nodular, rather immobile mass, extending on the left side to the diaphragm and pushing the lower ribs outward and upward. The tumor filled the whole left side, with dulness extending from a little to the right of umbilicus in front, around to the spine, and as low down as the anterior spinal process of ilium. It moved slightly up and down with each respiration. The whole abdomen was sensitive to touch.

The urine was normal except for a few hyaline casts.—*Blood examination*—Reds, 5,500,000; whites, 8,500; hemoglobin, 70 per cent. *Differential count*—Polymorphonuclears, 73 per cent.; small mononuclears, 4 per cent.; large mononuclears, 9 per cent.; transitionals, 2 per cent.; eosinophiles, 2 per cent.

The diagnosis lay between a probably malignant growth of the spleen or left kidney. Operation was performed on March

28, 1907. The kidneys, liver and intestines were found in apparently normal condition, except that the transverse colon and a coil of small intestine were adherent to the tumor, which was the enlarged spleen. Posteriorly there were adhesions to the abdominal wall and diaphragm.

All the adhesions were gradually released, ligatures being applied as needed. Spleen was then lifted out of the abdomen, the splenic vessels were tied, and severed.

Careful examination could find no trace of the sago-like growth, which was so universally present at the first operation ten years before, nor of any metastasis in the other abdominal organs. The wound healed by first intention, and the convalescence was uneventful.

Pathologist's Report by DR. ELIZABETH MORSE. Specimen is a greatly enlarged spleen, weighing 2410 gms., and measuring 26.5 x 15.5 x 10 cm. The contour is preserved and some splenic tissue remains along the convex border and at the upper pole. The rest of the organ forms externally a yellowish-white nodular mass, mottled with hemorrhagic areas.

On section it is found that the entire organ is converted into a tumor mass surrounded by a rim of splenic tissue $\frac{1}{2}$ -1 cm. thick. The growth has broken through the capsule near the hilus and presents papillary excrescences on the surface. It is not encapsulated, but it can easily be torn away from the splenic tissue. The cut surface is yellowish, translucent and coarsely granular, giving somewhat the appearance of sago. The tumor appears to be made up of large alveoli filled with gelatinous material and separated by broad trabeculae. It is friable in consistence and small mucoid granules can be expressed from the cut surface.

Microscopically the tumor is composed of large alveoli filled with epithelial cells which are surrounded by colloid material. Almost the entire growth has undergone colloid degeneration, only a few well-preserved alveoli remaining at the periphery. The tumor cells show little variation in form. They are round or low-cylindrical, indefinite in outline and closely packed together. The nucleus is vesicular and relatively large; the cytoplasm is small in amount. Mitoses are numerous, four or five being sometimes counted in one high-power field. Many of the cells in the partially degenerated areas contain clear droplets.

The splenic tissue at the edge of the tumor shows a great increase in the connective tissue, with hemorrhage, both old and recent, and round-celled infiltration. Elsewhere the lymphoid tissue is decreased in amount, the connective tissue of the pulp is prominent and the capillaries are dilated.

Diagnosis.—Colloid carcinoma, metastasis to the spleen.

The publication of this case has been purposely delayed pending the final outcome of the same.

Patient remained in very good health for four months, spending the summer in a camp and attending to all her family duties. In August the abdomen began again to increase rapidly in size, and she returned to the hospital. A small incision in the abdominal wall permitted the escape of a considerable quantity of free fluid, and the flushing of the cavity with normal salt solution. It was then noted that there were numerous small nodules of the same semisolid growth in the omentum, and in various parts of the parietal peritoneum. Although provision was made for permanent drainage, there was very little subsequent secretion of fluid, but a very rapid increase of the colloid growths, with increasing dyspnoea and exhaustion, till the end came rather suddenly on October 25th, seven months after the splenectomy.

The points of special interest are:

1. The probable development of the ovarian tumors either during or soon after the pregnancy.
2. The long interval of good health following the removal of the ovarian tumors and appendix vermiformis.
3. The entire disappearance of the sago-like growth observed at the first operation, and the appearance of a similar growth in the spleen—replacing the splenic tissue except for a slight rim.
4. That the same colloid growth reappeared in the abdomen after the splenectomy, doubtless taking its origin from that part of the spleen where the growth had burst through the capsule.
5. That the blood showed such slight variations, both before and after operation.
6. That there were no symptoms pointing to any special organ as the cause of the rapid emaciation and loss of strength.

GANGRENE OF APPENDIX IN A THREE WEEKS' OLD INFANT.

BY CHARLES H. DIXON, M.D.,

OF ST. LOUIS, MO.

THE rare occurrence of trouble in and about the appendix in the very young is the reason for reporting this case.

Baby S., an eight months baby, twenty-four days old, was taken with severe pains, and said to have cried most of night and morning. Had had no stool for twenty hours and no passing of flatus. I was called early in the afternoon, and found him suffering from a strangulated right inguinal hernia. Operated on at once, and found part of cecum and about 8 cm. of ilium in sac together with the appendix, which was adherent and gangrenous. The appendix was removed, the gut returned, and a radical operation to overcome the hernia performed.

The appendix, being adherent in the sac, was undoubtedly the cause of the cecum and ilium being drawn down. The mother states that the baby had suffered very much from attacks of colic, also that the motion of the child, in utero, the last two weeks was very much greater and lasted longer than at any other times.

Was the appendix attached in the canal, in utero? Did it cause increased peristalsis, causing excessive motion in utero, producing early labor, also the attacks of colic after birth?

The baby has had little or no colic since the operation, and has steadily gained in weight.

This is the earliest case of appendix trouble on record, and though the gangrenous appendix was due to the strangulation of the gut, the hernia was no doubt caused by the attached appendix.

PRIMARY SARCOMA OF THE PROSTATE.*

BY CHARLES A. POWERS, M.D.,

OF DENVER, COLO.

Professor of Surgery in the University of Denver.

Mr. A., of Cheyenne, a man of 60 years, consulted me February 7, 1907, regarding a rapidly increasing difficulty in urination. He had been an unusually strong and healthy man. He stated that he never had any sort of bladder trouble until two months before at which time he began to notice a little pain and discomfort on urination and began to rise in the night to urinate. The symptoms rapidly increased and coincidentally he lost flesh and strength.

Examination.—The man is five feet and nine inches in height; he weighs 180 pounds, having lost 25 pounds during the last two months. He complains of constant, severe pain in the hypogastric region and a constant pain which is less severe in the recto-perineal region. He urinates about every 1½ hours, day and night, urination being attended by increasing difficulty and pain. The urine is entirely normal. Catheterization finds no residual urine whatever; both soft rubber catheter and ordinary searcher pass easily to the bladder; no stone is found. Rectal examination reveals a very large, rounded, slightly nodular, balloon-like prostate. The finger does not reach the upper margin. The prostate bulges widely laterally and well posteriorly. The impression gained by the finger is an unusual one, the balloon-like mass seems so large and so uniform; it is only moderately tender, it is of moderate consistency; the abdomen is fat and rather rigid, the mass cannot be made out bimanually. The pulse is normal in frequency and in character; the heart sounds are clear; examination of the lungs is negative; the temperature is normal.

The patient was sent to a hospital and five days were spent in preparation for operation. During these days the urine was at all times abundant in quantity and normal in quality. While diagnosis was in doubt it seemed probable that the growth was malignant. The short duration of the symptoms, two months,

* Read before the American Surgical Association, May, 1907.

the rapidity of growth, the balloon-like contour of the growth and the absence of residual urine pointed toward sarcoma, and a tentative diagnosis was accordingly made; cystoscopy was not done. The situation was fully explained to the patient who definitely requested operation.

Operation under ether by the drop method at the Mercy Hospital, February 12, 1907. Ordinary, inverted Y incision. The central tendon of the perineum and the recto-urethralis muscle were divided; the deep urethra was opened and the finger passed readily to the prostatic urethra. A gloved finger of the opposite hand in the rectum allowed bimanual palpation and showed the growth to be larger and to extend higher than was at first thought. The finger tore readily through the prostatic urethra into the left side of the mass and the process of enucleation was begun. This was attended by profuse, alarming hemorrhage; blood poured from the wound and the wound had to be firmly packed with hot salt cloths. As soon as packing controlled the hemorrhage enucleation was proceeded with, but was exceedingly difficult. Very frequent hemorrhages obliged one to stop and pack. Nowhere could a lead be gained between the gland and its capsule. Friable masses were reamed out from both sides of the gland and from it posteriorly. These to the eye had the appearance of sarcoma. An assistant's fist above the pubes crowded the bladder down, yet one could not reach the upper part of the growth; this upper part seemed fixed. As much as possible was brought down and torn away by heavy, ringed clamps. At all points the growth seemed fused with the prostatic capsule, and it was apparent that here and there a portion was left behind. A T-shaped tube along side of which was sewn a small irrigation tube was placed in the bladder and the large prostatic cavity firmly tamped and packed with sterile gauze. The loss of blood had been great and although salt infusions had been given on the table the patient was returned to his bed with a poor pulse.

During the succeeding 24 hours the patient's condition was precarious, but under copious salt infusions and ordinary stimulation he picked up and at the end of 36 hours was in fairly good condition and secreting a good amount of urine. At the end of the second day a double pneumonia appeared to which he succumbed on the fifth day. An autopsy was not permitted.

The masses of growth removed amounted to a double hand-full. They were handed to Dr. J. A. Wilder, Professor of Pathology in the University of Denver, who makes the following report:

"The specimen consists of a number of large and small pieces of a reddish-gray, rather friable tissue. The pieces are irregular in shape, the larger ones are from two to five centimetres in diameter.

Histologic examination of sections from different parts shows the tissue to be composed chiefly of small round and oval cells with very little intercellular substance. A delicate fibrillar supporting meshwork in which the tumor cells lie can be made out in some areas. The nuclei of the cells are large and prominent and have a distinct nuclear membrane. A small ring of protoplasm can be seen around the nuclei of many of the cells, in others it cannot be seen. These cells have no definite arrangement. The vascular supply is fair. The bloodvessels have very thin walls and are surrounded by the tumor cells. The remains of the prostatic tissue are seen in some of the sections in the form of a stroma of unstriated muscle fibre and fibrous tissue containing gland-tubules lined with cuboidal epithelium, the glands in several instances containing corpora amylacea.

"*Diagnosis.*—Small round-celled sarcoma of the prostate."

In the foregoing case operative attempt was dangerous. Complete operative removal was to me impossible. Immediate microscopic examination of the first fragment removed from the growth might have certified its nature and thus have saved an operative death. The growth was extending so rapidly, however, that death by sarcoma would have been speedy. I doubt if the supra-pubic route would have given better access to the tumor than did the perineal, I judge that the hemorrhage was controlled better through the perineum than it could have been through the bladder.

A careful study and analysis of accessible literature records but 22 additional cases¹ of microscopically proven, primary

¹In certain instances cases have been accepted by one writer and discarded by another. In the present communication the writer has endeavored to class as authentic only those cases microscopically proven and primary. For example, the case of Dupraz is here classed as probable only, as it possibly had a primary seat in the scapula. The cases accepted in this paper may be verified through the table of references. In order to identify them the writer appends the age of the patient and the form of the growth as follows:

sarcoma of the prostate. These are reported by Barth, Birsch-Hirschfeld, Burckhardt, Botescu, Gibson, Grätzer, Kaufmann, Levy, H. Marsh, Matthias, Oliva, Socin (2 cases), Schalek, Spanton, Stern, Tordeus, West, Wharton,² Wind, Van der Hoeven, and Verhoogen. Cases which are not definitely authenticated but which are probably true cases are reported by Adler, Aiken, Cabot, Coupland, Dupraz, Harris, Isambert, Jolly, MacGowan,³ and Mann, while doubtful cases are instanced by Barth (2 added cases), Brée, Dickinson, Fergusson, Jolly (Anat. Specimen), Kapsammer, Reboul, Socin (added case), and Spanton.

The ages of the patients in the 23 cases classed as authentic are as follows:

15 years.....	13
16...30 "	4
31...60 "	5
Over 60 "	1
	—
	23

The condition is therefore to be considered most frequent in childhood.

Histologic examination of the specimens obtained from these 23 cases shows the form of the sarcoma to be:

Barth, 17 years, spindle and myxo-sarcoma; Birsch-Hirschfeld, 2 years, adeno-sarcoma; Burckhardt, 50 years, spindle celled; Botescu, 2 years, angio-sarcoma; Gibson, 35 years, small round celled; Grätzer, 15 years, large round celled; Kaufmann, 1½ years, small round celled; Levy, 4 years, myxo-sarcoma; H. Marsh, 5 years, spindle celled; Matthias, 70 years, angio-sarcoma; Oliva, 18 years, small round celled; Socin, 8 months, small round celled (also 51 years, round celled); Schalek, 3 years, mixed celled; Spanton, 5 years, myxo-sarcoma; Stern, 4 years, small round celled; Tordeus, 8 months, spindle celled; Wharton, 35 years, small round celled; Wind, 5 years, small round celled; Verhoogen, 53 years, myxo-sarcoma; Van der Hoeven, 6½ years; "Sarcoma" microscopic examination; West, 21 years, mixed celled; Author's case.

² Case also reported by Hughes.

³ A letter received from MacGowan since this paper was read leads the author to place his case in the accepted class.

Small round celled.....	in....	8 cases
Spindle celled	"	3 "
Myxo-sarcoma	"	3 "
Spindle celled and myxo-sarcoma.....	"	2 "
Small round celled and spindle celled.....	"	1 "
Angio-sarcoma	"	2 "
Adeno-sarcoma	"	1 "
"Mixed" celled	"	1 "
Large round celled	"	1 "
Mic. examined but form not given.....	I	"

23 cases

The small round celled form is therefore the most frequent.

As compared with carcinoma, sarcoma of the prostate is infrequent. Englebach gives as percentages carcinoma 86 per cent., sarcoma 14 per cent. This sarcoma percentage is undoubtedly very much too high. A reasonably accurate computation will not be made until reports are furnished on large clinics in which all prostatic growths are submitted to routine microscopic examination.

The diagnosis is at times easy, at times difficult. A rapidly growing tumor of the prostate in a child or youth is probably a sarcoma. So, as well, is a rapidly growing, soft, balloon-like prostatic tumor in an adult. Pain is generally marked and is referred to the pubes, perineum and rectum. Urinary urgency is not generally present in the early stages. As in the case which forms the subject of this paper an enormous growth may be unaccompanied by residual urine.

Prognosis in these cases is necessarily bad. In each of the authentic cases submitted to analysis by the writer either (a) the disease went on to a fatal termination or (b) the patient succumbed to operation or (c) to relapse after operation or (d) the case was reported simply as an operative recovery. An editorial writer in the *Am. Jour. of Urology* (1905-6, vol. 2, p. 129) goes so far as to say that the simplest and most rational treatment is to allow the disease to progress. While it is true that no lasting cure has thus far been reported it is but rational to assume that in the future early diagnosis and appropriate management, either by operation or by sero-

therapy or by both, may give to this disease a more hopeful outlook.

[Addendum—Nov. 22nd, 1907—Conforti and Favento (Sarcoma della prostata, *Folia Urologica*, Sept. 1907) in an interesting communication relate a well authenticated case and present a table of added cases. Their patient was a man of 45 years who died of cachexia 4 months after an operation for primary lymphosarcoma of the prostate. Their table embraces 30 additional cases. From this list I am able to take the following six true cases not presented in my own references:

(1) Bland-Sutton. Com. to the Clin. Soc. of London, 9 April, 1897—P't 7 yrs of age; spindle cell sarcoma.

(2) Guyon. Proust et Vian. Le Sarcome de la Prostata. *Ann. Des mal. des org. gén.-urin.* 1907. No. 10: P't 19 yrs of age; small round cell sarcoma.

(3) Kaufmann. Vide Socin & Burckhardt. P't 24½ yrs of age; lymphosarcoma.

(4) Rose. Zwei Fälle v. Prim. Sarc. d. Prostata. Com. Frei Verein. der. Chir. d. Berlin. 1901. P't 5 mos of age; small round cell sarcoma.

(5) Ibid. P't 2 yrs 9 mos of age; small round cell sarcoma.

(6) Stein. *Archiv. f. Klin. Chir.* Vol. 39. 1889. P't 25 yrs of age; "Sarcoma." (Mic. Exam'd.)

Including the case of Conforti and Favento 7 cases are to be added to the 23 presented in the body of this article. The addition of MacGowan's case makes a total of 31 authentic cases. C. A. P.]

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A SYSTEMATIC OPERATION FOR PENILE HYPO- SPADIAS AND OTHER DEFECTS OF THE URETHRAL FLOOR.

BY G. FRANK LYDSTON, M.D.,

OF CHICAGO.

IN the New York *Medical Journal* of April 29, 1905, in an article entitled "Contribution to the Plastic Surgery of the Urethra," I outlined a number of procedures for the restoration of the urethra in lesions of varying extent and severity. In this article I formulated principles of technique which, I think, must, when conscientiously followed, solve many of the problems of "urethra building." I have applied these same principles to the relief of penile hypospadias, and have, I believe, thereby solved one of the most trying of surgical problems. I will state that, in my operation, the technique devised by my friend, Dr. Carl Beck, of New York, is exactly reversed. It has been my experience that in cases of penile hypospadias in which the deformity is marked, the urethra is contracted bow-string-wise, and that Beck's operation is likely in most cases to make a bad matter worse, especially so far as the sexual function is concerned. It will be noted that in the operation herewith presented the patient's condition cannot possibly be aggravated, the deficiencies of neither the sexual nor the urinary function being increased by the operation. In case of failure the tissues involved are not of sufficient importance, nor so scanty as to increase the deformity; neither will one or several failures prevent further operative efforts. The principles of the technique are the same as those described in my article already mentioned.

The preliminary operation for curvature, and urethral transplantation are, of course, unnecessary in cases of extensive destruction of the anterior urethra by traumatism or disease. Three highly successful cases of operation for penile hypospadias have proven to my own satisfaction the correctness of

FIG. 1.

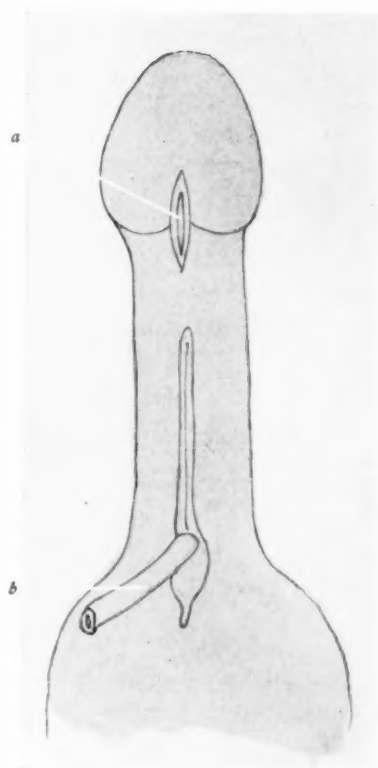


FIG. 2.

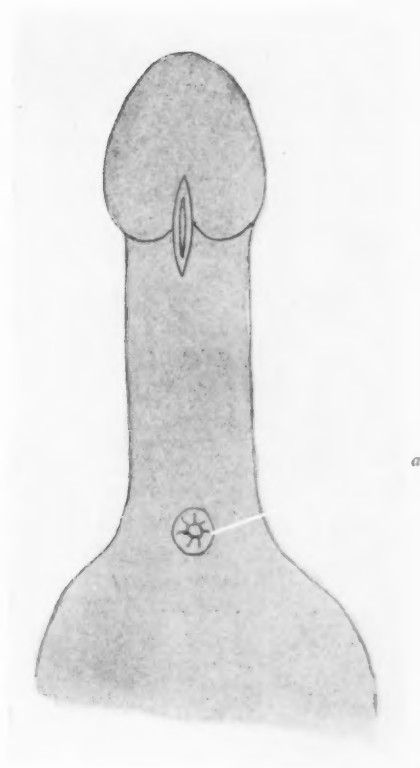


FIG. 3.

FIG. 3.

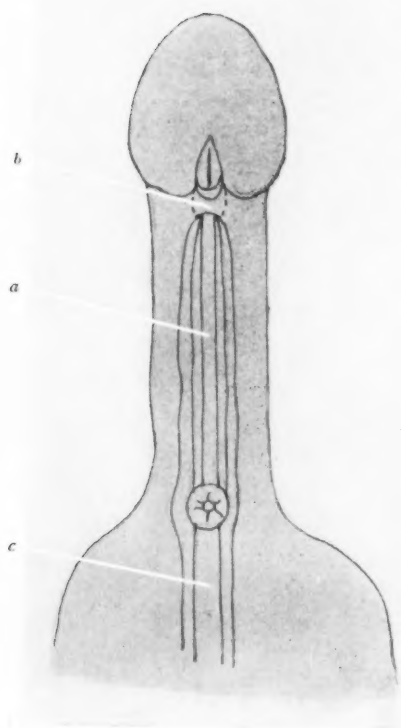
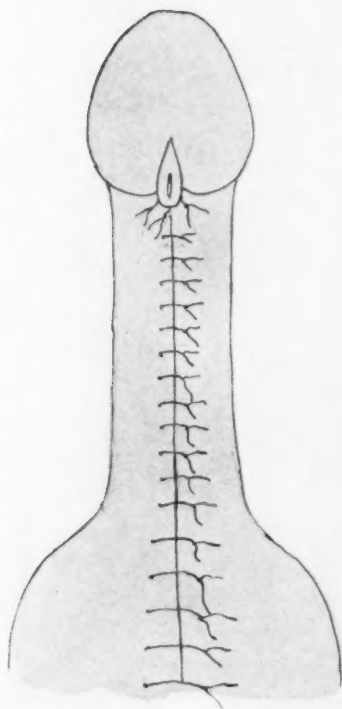


FIG. 4.



the technique, and that it is the ideal method for such cases. The three cases were almost identical, and the operative technique the same. I append in detail, illustrations showing the various stages of the operation, in my last case.

CASE: A youth of seventeen presented himself with penile hypospadias, the meatus opening about an inch and a half posterior to the base of the glans. The penile curvature was so marked that the sexual function was destroyed. Micturition was normal, but the patient complained of soiling of the clothing by the urine. The normal meatus was represented by a cleft, (a. Fig. 1) and the urethra anterior to the pseudo-meatus was entirely absent.

PRELIMINARY OPERATION. The corpus spongiosum was dissected from the body of the organ, and all constricting bands of fascia upon the under surface of the corpora cavernosa divided. The incision was begun anteriorly, just in front of the pseudo-meatus. The corpus spongiosum urethræ having been dissected free, as shown in Fig. 1b., the muco-cutaneous border of the pseudo-meatus was trimmed away, no further resection of the apparently redundant urethra being necessary. As soon as the organ was straightened, a little tension on the perineal urethra with the thumb and fingers caused the freed urethra to sink well down within the perineo-scrotal space. The margin of the anterior extremity of the freed urethra was now split above and below, and the skin and mucous membrane sutured with fine catgut so as to insure permanency of the new meatus, which was located just at the peno-scrotal angle. Fig. 2a.)

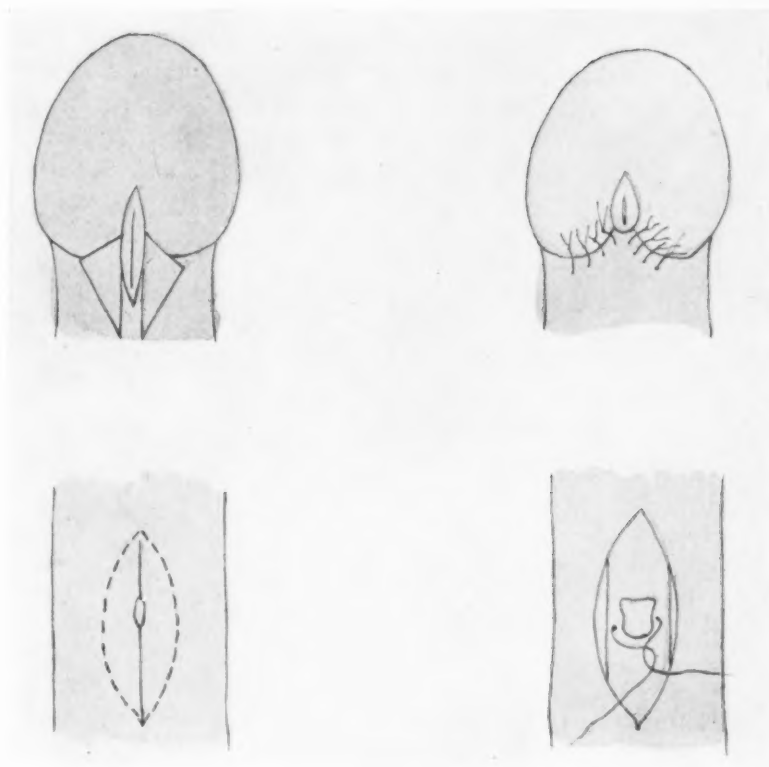
The incision on the under surface of the penis was now closed, and the organ strapped up over the abdomen, so as to hold it straight and immobile, as near as might be.

A second operation to restore the caliber of the meatus had to be made on account of the patient's negligence, in failing to report for dilation. The patient was confined to bed for two weeks. Ninety days later, the new meatus at the peno-scrotal angle having retained its patency, and the cicatricial tissue about it and on the under surface of the penis in the line of the longitudinal incision made for the purpose of freeing the corpus spongiosum having become reduced to a minimum, the final operation was performed.

A perineal puncture was first made and catheter drainage established. Two longitudinal incisions were made upon the under surface of the penis, beginning at a point about three-quarters of an inch posterior to the cleft approximately representing the normal site of the meatus. A strip of skin a little over $\frac{1}{8}$ of an inch in width was left upon the under surface of the penis, this strip of skin being continuous with the mucosa of the roof of the urethra at the peno-scrotal angle. (Fig. 3a.) This strip of skin was designed to form the roof of the new penile urethra. (A very narrow strip of skin is sufficient. During repair the epithelium is reproduced to a sufficient extent to thoroughly cover in the roof of the new urethra.) The skin was now dissected up laterally to the right and left on the under surface of the penis for a distance of about three-quarters of an inch. This was continued forward in such a way as to form a bridge anteriorly by tunneling to a point corresponding to the posterior commissure of the cleft already described. (Fig. 3b.) This bridge of tissue was raised and the quasi-mucous membrane at the bottom of the cleft stitched to the anterior extremity of the strip of skin above described. This completed the roof of the new canal. A rectangular longitudinal flap was now outlined in the median line of the scrotum this flap being a little less than an inch in width. (Fig. 3c.) A strip of epithelium, one-half inch wide, in the center of this flap was preserved and the outer borders of the outlined flap denuded of epithelium. The flap was now dissected free, its corners rounded slightly, and the flap brought forward and upward, its anterior extremity being stitched to the borders and sides of the space beneath the bridge of skin anteriorly. (Dotted line, Fig. 3.) The edges of this flap were stitched upon either side with fine catgut to the fascia of the penis at the base of the lateral penile flaps. This completed the edges of the lateral flaps and the edges of the wound made in the formation of the scrotal flap were stitched together with horsehair. The completed operation is shown in Fig. 4.

The progress of the case was uneventful. A very small area of sloughing was formed at the anterior extremity of the flap, so that the new meatus was perhaps one-quarter of an inch longer than it would have been had the sloughing not occurred. At the end of three weeks the patient was urinating normally through the new urethral canal; the deformity was completely

FIG. 5.



40 41 42

relieved, and the conditions were as satisfactory as one could wish.

In my first two cases of the kind no sloughing whatever occurred.

I wish to reiterate what I have in substance already stated, that in case of complete failure of an operation of this kind the patient is no worse off than before the operation. Failure could hardly be complete in any case, and any portions of the flaps that retain their integrity will be so much gained. Subsequent operations can be readily made, as the tissues from which the flaps were formed are abundant. In making the urethral floor the entire thickness of the scrotum should be employed, and care should be taken not to "score" it. I believe that the tendency on the part of the surgeon would naturally be to thin down the edges or anterior extremity of the flap. I wish to warn against this, as the essence of the operation is in the preservation of the vitality of the scrotal flap.

SIMPLE FRACTURE OF THE CARPAL SCAPHOID.*

WITH A REPORT OF SEVEN CASES.

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IT is not intended that this paper shall treat exhaustively the subject of fracture of the carpal scaphoid, but its purpose is to call attention to the more important symptoms, the diagnosis and treatment of the uncomplicated injury in its recent state. The good result obtained in four of the seven cases herewith reported is unquestionably due to the fact that the diagnosis was made and the proper treatment instituted within a few hours after the fracture was received. While the force exerted at the time of the injury no doubt determines, in a large measure, the amount of displacement in the fragments, yet a failure to immobilize the wrist joint very early, might tend to change an otherwise favorable into an unfavorable case, for union with the fragments in good position is necessary in order to obtain the best results.

Of the seven cases upon which these observations are based, four were treated in the out-patient department of Bellevue Hospital and three in the out-patient department of the New York Hospital. All were treated since January the 26th, 1907. In seven years continuous out-patient service I had not before this recognized a single case of carpal fracture, no doubt treating more than one during all that time as a simple sprain. If, however, any cases were overlooked in the last five years it was due to the fact that they were not considered of sufficient importance to have them radiographed, for it has been the routine custom at the New York Hospital to X-ray and keep a record of the findings of all cases of suspected frac-

* Read before the New York Surgical Society, October 23, 1907.

ture since 1902. The same custom is in vogue at Bellevue and the same criticism holds good.

The cases followed closely one upon the other, a number being under observation at the same time. A positive diagnosis was made in four of the cases with little difficulty, and in two the condition was strongly suspected. In the other case (No. VII) the patient had been treated for a Colles fracture for four weeks before coming under our care, and the fractured scaphoid was accidentally discovered by the X-ray; the radius had not been fractured. The ages of the patients ranged from thirteen to forty-six years and the injury was received in each case, save one, by falling on the extended hand. The single exception (Case I) fell from his truck and is sure that he struck on the back of the flexed wrist, although there was no ecchymosis or sign of contusion. All of the patients were males. The left wrist was the seat of the injury five times and the right twice.

A remarkable feature of Case IV is the fact that the X-ray picture shows a fracture of both scaphoids. This patient received an injury to the left wrist by falling from a scaffold the day before admission, but did not in any way injure the right; however, he recalled upon being questioned, having injured his right wrist some six or seven years before while attempting to move a heavy stone. The injury was treated as a sprain and nothing more was thought of it until he began to work as an electrician two years ago. At that time he found the right hand much weaker than the left, and that he favored it in all efforts requiring rotation or extension. Case VI, aged thirteen, is so far as I can find out, the youngest yet recorded. Case VII was not seen until four weeks after the injury, the others were treated in from one to twenty-four hours after being hurt. In Cases III, V and VI, as shown by the radiograph, there was practically no displacement of the fragments, and in only one case (No. IV) was the displacement marked.

The line of fracture was in the middle third in six cases and at the junction of the middle and proximal thirds in one.

In so far as we could determine from examination of the patients and X-ray photographs none of the other carpal bones was fractured, nor was there dislocation of the semilunar bone.

The immediate symptoms of fracture of the carpal scaphoid are very similar to those of a sprained wrist, *viz.*, there is a history of a fall on the extended hand (6 out of 7 cases) followed by pain, swelling and disability. In each of our cases one or all of these symptoms were so severe that the patient sought advice in less than twenty-four hours. The pain was intense immediately after the injury, but in most of the cases had subsided so that the patients were fairly comfortable on admission. The hand was held rigid, and this undoubtedly accounted for the quiescence of the pain, motion in any direction, however, caused it to recur, especially any effort at extension either active or passive. In fact, extension was limited in each instance to a few degrees, while flexion was permitted in from fifteen to thirty degrees.

The swelling followed the injury quickly and was more marked on the dorsal aspect and radial side of the wrist. In only one case (No. I) was it extensive. A photograph of Case VI, taken twenty-four hours after the injury, shows the average amount of swelling and the absence of any apparent bony deformity. (Fig. I.)

The disability is about what would be expected when the nature of the injury is taken into consideration—loss of power to grasp an object or inability to perform any function requiring an effort at extension or rotation.

Upon examination it will be found that the swelling is mostly on the radial side of the wrist, that the ulnar and radial styloids are normal in their relations and that pressure over the middle of the scaphoid, with the hand slightly flexed and adducted, causes exquisite pain. This tender point with the pain upon efforts at extension are the two most characteristic symptoms. Ecchymosis was not present in any case—either immediate or late. Crepitus was obtained in two cases (Nos. I and III), and it was due to this fact that the diagnosis in the first case was so readily made. This sign was elicited in Case

FIG. 1.



Photograph of Case VI twenty-four hours after injury.

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I by my associates at Bellevue, Drs. Garrigan and Cramp, as well as myself, and was easily detected without undue pain and in spite of the unusual swelling which was present in this case. I do not believe that it is necessary by any means to obtain crepitus in order to make the diagnosis, nor do I think it wise to use force in trying to get it, for any undue manipulation may displace one of the fragments, thereby jeopardizing the chances of obtaining a good result.

The diagnosis of simple fracture of the scaphoid should be made in the majority of cases without much difficulty. The history of a fall on the extended hand, the swelling along the radial side and dorsal surface of the wrist, the localized point of tenderness below and to the dorsal side of the radial styloid and the extreme pain when any attempt is made to extend the wrist, form a symptom complex which makes the recognition of this condition fairly certain. If to the above we add crepitus, little doubt remains. Finally every case of injury around the wrist joint, of sufficient severity to cause the patient to seek advice, should be radiographed. This should be done not only to verify the diagnosis, but it is of great value in giving the prognosis, as the amount of separation or displacement of the fragments govern the final result.

I agree with the statement of Codman and Chase in their splendid article on this subject, that it is not necessary to give ether in order to make the diagnosis, but that we should depend upon the clinical symptoms and X-ray findings. Resort to anæsthesia should be made only in those cases where some complication exists, as dislocation of a fragment or the semi-lunar bone or both and then for purposes of reduction.

In cases of sprain the tenderness is not so marked, the swelling is apt to be more evenly distributed and efforts at extension are not so painful.

In fractures of the lower end of the radius the swelling extends much higher on the forearm, the point of tenderness is above the level of the styloid processes and usually there is the characteristic deformity of Colles fracture. Occasionally, however, we see fractures of the lower end of the radius with-

out deformity, and here the point of tenderness is of most diagnostic value.

The suggestion of Codman and Chase that both hands be radiographed on the same plate has been adopted and has proven of great assistance in that it has helped to properly interpret the plates. The uninjured carpus acts as a guide, as by it we can get a better idea of the location of the fracture, the amount of displacement in the fragments, etc.; furthermore, the question of a bipartite bone is settled. In six of the cases the uninjured scaphoid corresponds in every particular with the normal. The seventh is the case in which there had been an injury to the other hand six or seven years before. That both scaphoids have been fractured in this case there can be no doubt, as the radiograph shows plainly the line of fracture and the displaced proximal fragment in the recently injured side, and in the old injury it shows that the distal fragment has apparently turned and is lying at a right angle to the normal axis of the bone. The radiographs should be taken in two planes, anteroposterior and lateral and several should be made in order to avoid mistakes. If the patient can adduct the hand (ulnar flexion) without too much pain, it is better to have the anterior exposure made with the hand in this position as it gives a much clearer view of the scaphoid.

The treatment for simple fracture of the carpal scaphoid in the recent state, with the exception of those cases in which there is considerable displacement or dislocation of a fragment, should be immobilization with the hand straight. Fixation is best accomplished by means of moulded plaster splints extending to the bases of the fingers. A small pad of gauze was placed over the dorsal aspect of the bone, and held in position by adhesive plaster, in each of our cases before the splints were applied, it seemed to exert pressure just where the swelling was most marked and probably helped hold the fragments firm. Fixation should be employed in every case as soon as the clinical diagnosis is made, if the radiograph does not confirm the diagnosis no harm is done, but if on the other hand the fracture is found, much good will have been accomplished.

The fingers should be moved freely from the outset. Once a week the splints should be readjusted and at the end of the third week they should be removed for fifteen minutes daily and the wrist gently massaged; after the fourth week the splints are discarded and a snug bandage is worn as a support from two to three weeks. At the end of this time the hand will be fairly strong, but the tenderness in the region of the anatomical snuff box and the pain on forced extension will persist for some weeks longer.

In the cases where there is marked displacement or dislocation of a fragment and correction cannot be made under anæsthesia, one or both fragments should be removed without delay. If the displacement is not too great, an attempt to adjust the fragments by varying the position of the hand, and noting the result with the fluoroscope, would be worth trying before proceeding radically.

The final result will depend upon the position of the fragments, the presence or absence of complications and upon the length of time that elapses after the injury is received until the wrist joint is immobilized. In three of the cases (III, V and VI) there was very little separation and no displacement of the fragments and in each the result has been practically perfect. In one (Case II) the separation was greater and the line of fracture more uneven than in the above, and while the result can be classed as very good, yet there is limitation of extension to about one-half normal. In every other respect the outcome in this case is the same as in Cases III, V and VI. In the fifth and final case which I have been able to trace (No. IV), the result is by no means so satisfactory. The radiograph of this case, taken twenty-four hours after the injury, showed considerable inward displacement of the proximal fragment, and it is evident from a recent examination and radiograph (five months after the injury) that union has occurred with faulty position.

As I look back on this case, it would no doubt have been wiser to have removed the proximal fragment at the outset. Such a course has been advised if improvement does not take

place in the next two months. If union is very firm, the entire bone may have to be sacrificed.

CONCLUSIONS.

1. Simple fracture of the carpal scaphoid is caused as a rule by a fall of moderate height (3 to 7 ft. in this series) on the extended hand.

2. This form of fracture is more apt to be overlooked than the complicated type on account of the absence of deformity and the resemblance it bears to a sprained wrist.

3. Exquisite tenderness on pressure with the wrist slightly flexed and adducted, just below and to the dorsal side of the radial styloid, with extreme pain on any effort at extension, are the two most characteristic symptoms.

4. Union will take place provided the fractured surfaces are in contact and the wrist is immobilized for from three to four weeks.

5. The final result, under proper treatment, will depend upon the amount of separation or displacement of the fragments. In cases where the position of the fragments is good the result should be practically perfect.

6. If there is dislocation or considerable displacement of a fragment which cannot be corrected, one or both fragments should be removed without delay.

For the radiographs of the cases I am indebted to my friends Drs. A. H. Busby and J. H. Kenyon.

CLINICAL RECORDS.

CASE I.—D. W., male; aged forty-one years; driver. Admitted to O. P. D. Bellevue Hospital January 26, 1907, with a history of having fallen from the seat of his wagon the day before. He says that his hand turned under him and that the force of the fall came on the back of the wrist. Pain and disability immediate, swelling gradual. Upon examination eighteen hours after the injury the swelling was very marked, extending for a considerable distance up the arm, and was double the amount present in any of the cases that followed. No ecchymosis. Flexion to 20 degrees. Extension, abduction and adduction

caused intense pain and were limited to a few degrees. Marked tenderness in the scaphoid region. Crepitus obtained without undue force. Diagnosis of fracture of the scaphoid made and confirmed by the X-ray. The radiograph showed the fracture to be in the outer portion of the middle third of the bone and the fragments to be in fairly good position. Moulded plaster splints extending to the bases of the fingers with a pad over the scaphoid. Splints readjusted at the end of the first and second weeks. Massage for fifteen minutes every other day after third week. Plaster left off at end of the fourth week. This case was examined on March 9th, six weeks after the injury, and the fragments seemed to be united. There was moderate tenderness over the scaphoid and extension was painful, but there was fair motion in all directions. The patient had returned to his work as a driver and was pleased with the result. Repeated efforts to find this man for a final examination and X-ray have failed.

CASE II.—F. K., male; aged twenty-seven years; driver. Admitted to O. P. D. Bellevue February 28, 1907. About two hours before coming to the hospital he had slipped from the ice-covered foot board of his wagon falling on the extended left hand. There was immediate pain and disability followed by swelling. Examination showed moderate swelling in the scaphoid region. Pressure in the anatomical snuff box elicited the characteristic point of tenderness. All efforts at motion caused extreme pain. Ecchymosis and crepitus absent. In view of the history and having in mind the preceding case, the diagnosis of simple scaphoid fracture was made and confirmed by the X-ray. The fracture was just distal to the middle of the bone and there was moderate separation of the fragments. The treatment was carried out as in the first case except that the splints were left off about the middle of the fourth week. This man returned to work in six weeks though there was still some swelling and tenderness and limitation of all motion to about one half normal. Examination September 11th, six months after the injury, shows normal flexion, adduction and abduction, but extension is limited to half the normal. There is no tenderness on pressure over the scaphoid, nor is there pain or muscular spasm when the hand is forcibly extended. Extension seems to be limited by the slight thickening in the region of the scaphoid. There is just the least fullness below the tip of the radial styloid, other-

wise the appearance of the two hands is the same. Radiograph taken September 1, 1907, shows the bone to be shorter than the opposite one, due to slight overlapping of the fragments, union, however, has taken place. This man is working every day, has no pain or discomfort and says he considers his left hand as well and strong as the right.

CASE III.—J. McK., male; aged twenty-six years; driver. Admitted to the accident ward of the New York Hospital March 14, 1907, with a history of having fallen a short time before upon his extended left hand. He was pulling on a rope when it broke and he fell from his wagon to the street, a distance of about five feet. Was treated by Dr. Truesdell of the House Staff who made a probable diagnosis of fractured scaphoid and applied moulded splints. The case was referred to the O. P. D. on the following morning. Upon examination the swelling was slight, due, no doubt, to early fixation of the joint. The pain on any attempt at motion and the tenderness over the scaphoid were present. No ecchymosis. Crepitus was obtained in this case, the second and last one of the series in which it was present. X-ray verified the diagnosis. The fracture was at the middle of the bone and there was practically no displacement of the fragments. Treatment as outlined except that this patient did not return after the third week, consequently had no massage. He removed the plaster himself and went to work on the twenty-eighth day. I examined him and had an X-ray taken on September 1, 1907. It was with difficulty that I could tell which hand had been injured, so good has been the result. The range of motion is normal and there is no tenderness over the scaphoid or pain on hyper-extension. There is no fullness in the region of the anatomical snuff box. The recent radiograph shows distinctly the line of fracture. Union is complete with the fragments in perfect position. This patient is following his occupation as a driver and uses the left hand every bit as well as before he was injured.

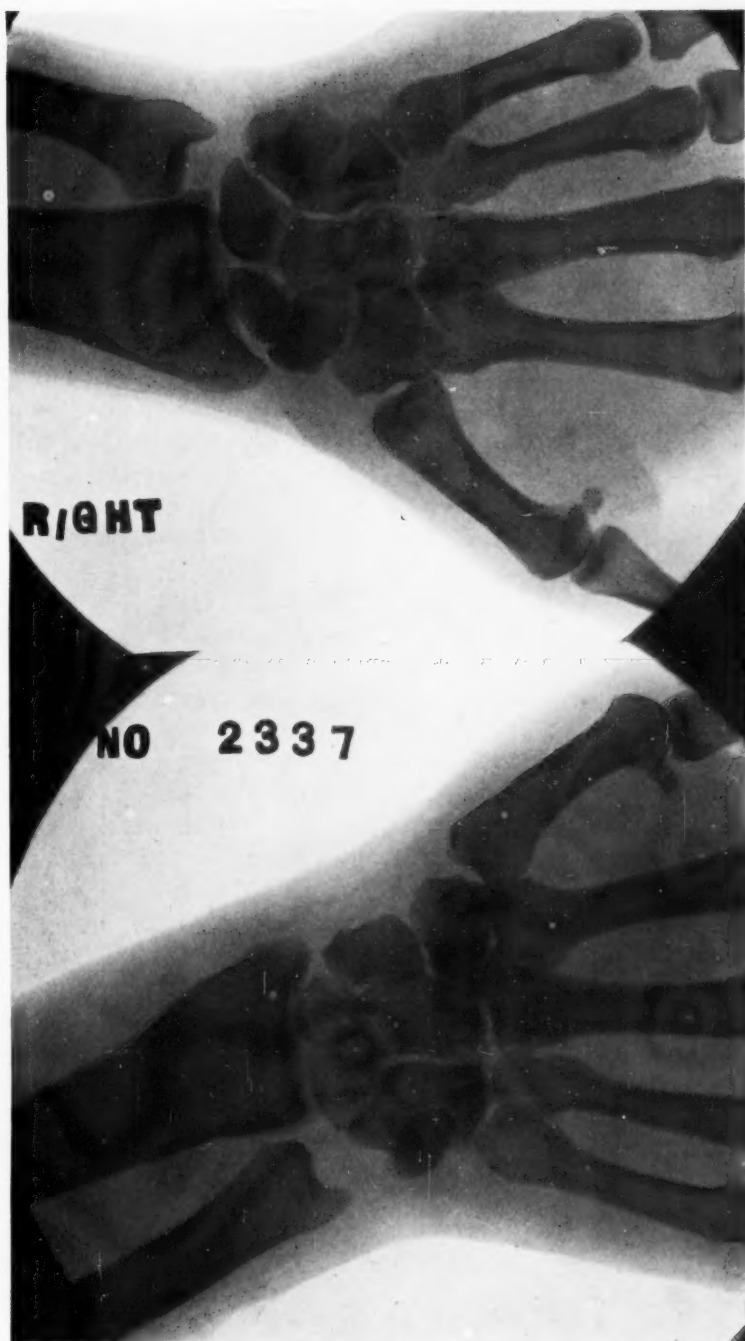
CASE IV.—A. R., male; aged twenty-one years; electrician. Admitted to the O. P. D. New York Hospital March 27, 1907. On the afternoon before he had fallen from a scaffold seven feet high, receiving the weight of the fall on the palm of his left hand. There were the usual symptoms which go with a severe injury to the wrist and the physician who saw him immediately after the

accident treated the case as a fracture of the lower end of the radius. Upon examination at the dispensary we found the swelling moderate and confined almost entirely to the dorsal surface of the radial half of the joint. The slightest motion caused exquisite pain, in fact this patient complained more bitterly of the pain than any of the others, consequently it was difficult to make a very complete examination. The tenderness was not localized as in the other cases, but involved the radial half of the carpus. Injury to the radius was ruled out and a diagnosis of fractured scaphoid, with probable injury to some other carpal bone, made. The radiograph showed only a transverse fracture of the scaphoid at the junction of the middle and proximal thirds, with median displacement of the proximal fragment. Moulded splints with gauze pad applied in the usual way and massage given after the third week. The symptoms at the end of six weeks had not improved as in the other cases; the swelling had disappeared only partially, the pain on extension beyond five or ten degrees and on flexion more than twenty degrees was severe and there was marked tenderness over the inner half of the scaphoid. For one reason or another I did not see him for three months after this, in the meantime he had resumed his work, but the pain and partial disability were such that he could not do satisfactory work and he again consulted me. The condition had improved considerably since I last saw him, however, the fullness over the scaphoid the limitation of motion to about half the normal and some tenderness were still present. Examination September 18th, showed very little change. According to the radiograph taken August 28th, there is union, but the position of the fragments is bad. This is the case in which the opposite scaphoid (right) had been fractured, some years before, the discovery of which was accidentally made by taking a radiograph of the two hands. Examination of the right hand shows that extension cannot be carried beyond a straight line, all other motions, however, are normal. There is a slight atrophy in the region of the anatomical snuff box and with the hand completely flexed there is a distinct depression at this point. According to my interpretation of the X-ray the distal fragment has rotated and a false articulation has resulted.

CASE V.—A. E., male; aged twenty-nine years; carpenter. Admitted to the O. P. D. New York Hospital April 10th, twelve

hours after falling from a moving street car. As he fell he put out his left hand to save himself and the force of the fall came on the palm. The pain and discomfort were only moderate and not until the following morning did he seek treatment. On examination the swelling was of the average amount and in the usual situation. Flexion, abduction and adduction were permitted to a greater extent than in any of the other cases. Intense pain, however, was caused by pressure in the anatomical snuff box and on the strength of this with the limitation of extension a probable diagnosis of fracture of the scaphoid was made. The X-ray taken on the following day showed an irregular line of fracture, the outer portion situated just at the tubercle, is roughened, while the inner half is smooth. Same treatment applied as in the other cases. Patient discharged at the end of fifth week. All symptoms, except pain on forced extension and moderate tenderness in the snuff box, had disappeared. Examination and X-ray September 13th show the wrist to be practically normal. In the radiograph the inner half of the line fracture can be made out. Union is complete. This man works at his trade every day and says there is no difference in the two hands.

CASE VI.—W. C., male; aged thirteen years; office boy. Admitted to the O. P. D. Bellevue Hospital April 25, 1907, with the history of having fallen from a ladder upon the extended right hand one hour before. Distance of fall about five feet. The pain was intense and it was for the relief of this symptom that the boy sought treatment. Swelling moderate and about the same as is shown in the photograph taken twenty-four hours after the injury (Fig. 1). On account of the pain the wrist was handled very little. Motion was very slight and the disability complete. Fracture of the scaphoid was considered the most likely diagnosis, but on account of the boy's age no one would venture a positive opinion. The radiograph (Fig. 3) showed a fracture running obliquely in the outer portion of the middle third of the bone. The wrist was immobilized and treated as outlined above. Splints removed after the third week. I examined this boy August 19th, four months after the injury and the wrist seemed normal in every particular. No pain, no tenderness and no limitation of motion. X-ray taken at this time gives the bone the appearance of being a little denser along the line of fracture than the normal. Union perfect.



CASE IV.—Recent fracture, left scaphoid. Old fracture of right. Radiograph at time of recent fracture.

FIG. 3.



CASE VI.—Fracture right scaphoid. Radiograph at time of injury.

CASE VII.—J. F., male; aged forty-six years; hostler. Admitted to Out-Patient Department Bellevue, April 25, 1907. Four weeks before he had slipped upon the sidewalk and fallen on the extended left hand. He was treated for a Colles' fracture in one of the larger hospitals of this city, but was not satisfied with the result. The wrist was swollen and had the appearance of a case of sub-acute arthritis. Motion was limited to a few degrees of flexion. There was tenderness over the entire carpus, due, no doubt, to the force which had been used the day before in an attempt to break up adhesions. The fingers were held in extension and could be only slightly flexed. Disability complete. No diagnosis was made, but the radiograph showed a transverse fracture at the middle of the scaphoid with displacement of a small fragment to the outer side. Massage and Bier's hyperæmia were begun on this patient and carried out for three days when his visits to the dispensary ceased. We have since been unable to locate him.

[Since writing this paper three additional cases of simple fracture in the recent state have come under my observation.]

OBSERVATIONS ON THE TREATMENT OF FRACTURE OF THE NECK OF THE FEMUR IN 112 CASES.*

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Since January 1st, 1906, there have been admitted to Bellevue Hospital, 378 cases of Fracture of the Femur, and of these, 112 were cases of Fracture of the Neck.

SEX. 53 cases occurred in males and 59 cases in females. 49 involved the right Femur and 58 the left Femur.

AGE. 9 cases occurred in patients under 30 years of age,

21	"	"	"	between 30 and 50	"
22	"	"	"	50	" 60 "
42	"	"	"	60	" 70 "
15	"	"	"	over 70	"

In 3 cases the age was not given.

Formerly it was regarded as a fracture occurring almost exclusively in old age. Kocher stated that he had observed it rarely before the age of 50. Our statistics show a large number occurring below the age of 50. This is probably due to the fact that all accident cases are now more frequently brought to hospitals for examination. The fact that its frequency increases with age is due to the senile changes of old age—senile osteo-porosis, which is caused by the diseases of the vascular walls. The cortex becomes thinner, many of the lamellæ of the spongiosa are absorbed, and are replaced by large cavities filled with yellow marrow. All the conditions, which formerly gave the neck its power and resistance are lost and more especially in women than in men, so this fracture occurs more frequently in women than in men, as above 59 cases in females and 53 cases in males.

CAUSE. In 51 cases the cause was due to slipping and fall-

* Read before the New York Surgical Society, October 9, 1907.

ing upon the floor or sidewalk, frequently due to a misstep. These cases were generally more than 60 years of age. In 28 cases it was due to falling from a ladder, scaffold or down stairs, requiring more force than in the first group.

In 18 cases it was due to a fall from some greater height; as from a loft, down an elevator, or from a fire escape, etc. These cases were all under 50 years of age.

Thus the most frequent cause was mild in character, and involved chiefly the old, while in the younger individuals greater violence was the rule. In many cases it stated that the patient fell directly upon the hip and that a contusion was found on this area, so that here direct violence was the cause. In several others, "that as he stumbled he tried to straighten up to prevent falling, he suffered severe pain in the hip and fell." The explanation of this indirect cause is that the hyper extension of the hip joint tightens the ilio-femoral ligament and the latter by reason of its greater strength tears the neck away from its base, the trochanter.

SYMPTOMS. Pain was present in every case, and was always increased when motion was made.

Loss of function was noted in 94 cases; in but few cases could the heel be partly drawn upward toward the hip.

ANATOMY. In consulting the records of the above cases, which were dictated at various times by different surgeons, a considerable variation of nomenclature was found. Some adhered to the old terms of intracapsular and extracapsular, others included both varieties of fractures under the single term of "Fracture of Neck"; others used Kocher's classification of *fractura subcapitalis* and *fractura intertrochanterica*.

The terms intracapsular and extracapsular are unscientific, inaccurate and misleading because the majority of cases do not fall distinctly into either group, for they are "mixed." Intracapsular cases were supposed to include all fractures in which lines were entirely within the capsule; extracapsular all those which were entirely without the capsule; but as the majority of fracture lines are oblique or diagonal and not strictly transverse, a fracture might be intracapsular in front and extra-

capsular behind, for the capsule is so arranged that it includes more of the joint in front and below than above and behind.

Kocher's terms while more strictly anatomical did not gain popular usage.

Stimson's classification has been followed; *i.e.*, fracture through the neck or subcapital, and fractures at the base of the neck. The neck is apt to break in one of two places, at its junction with the head, or at the base, its attachment to the trochanter.

Formerly it was considered of more importance to differentiate closely between these two fractures as if the fracture were intracapsular the prognosis would be far more unfavorable than if the fracture should be extracapsular, consequently less would be expected and the treatment might be less efficient.

Outward rotation was noted in 80 cases. If a line be drawn through the axis of the limb passing through the anterior superior spine and the tip of the great toe, the part of the limb lying to the outer side of this axis will be much heavier than the inner part. If now the normal support of the limb, the femoral neck be broken, the limb will naturally rotate outward by its own weight. When impaction occurs it will also be rotated outward, for the impaction takes place usually at the posterior portion of the neck and the trochanter is twisted backward.

Shortening was recorded in 70 cases.

In 3 cases $\frac{1}{4}$ inch existed

10	"	$\frac{1}{2}$	"	"
22	"	$\frac{3}{4}$	"	"
20	"	I	"	"
15	"	$1\frac{1}{4}$ -2	"	"

Shortening is the most important symptom and depends upon the lessening of the angle between the neck and the shaft, which approaches more to a right angle, upon impaction of the fragments or their displacement longitudinally. After the fracture occurs the strong muscles which are inserted about the trochanter contract and draw the trochanter upward, inward and

backward toward the crest of the ilium, until checked by the resistance of the untorn portion of the capsule or by the abutment of the lesser trochanter against the inner fragment.

If impaction occurs the lower portion of the neck may be forced into the spongiosa of the head; under these conditions shortening is not more than one inch. If the impaction is separated and the capsule yields, the shortening may become increased to several inches. This was observed in several cases where movements had been made, and the weight of the body had been borne upon the fracture.

Exact measurement is frequently difficult because it is so hard to keep both legs at the same angle with the pelvis; they should be parallel or equally abducted from the median line. The measurement should be taken from the anterior superior spine to the most prominent point on the internal malleolus.

Bryant's method was frequently used. It consists in dropping a perpendicular from the anterior superior spine and measuring the distance from this line, to the top of the trochanter and then comparing this with the other side.

A number of records merely stated that the trochanter was above Nelaton's line,—a line drawn from the anterior superior spine to the tuberosities of the ischium.

Crepitus was recorded in 40 cases, and was elicited when gently rotating the leg with slight flexion.

False motion was occasionally mentioned.

Impaction was seldom recorded,—in but six cases; when one considers the histories of the class of cases who enter Bellevue, the period of delay which frequently exists, it is not surprising that impaction seldom persists. That it was present at some time to some degree can be recognized from the X-ray plates. These were made in 36 cases. In 29 cases the fracture was at the base and impaction existed in 18 cases; in 6 cases the fracture was through the neck and impaction existed in one case.

FULNESS IN SCARPA'S TRIANGLE. Under normal conditions the finger tips can be pressed deeply into the outer portion of Scarpa's triangle, but in those cases in which there

has occurred a fracture of the neck a marked bony resistance is perceived on pressure. This is due to the fact that in the most common variety of fracture the head and neck are bent backward and downward, thus resulting in forcing the apex of the fractured angle upward and forward into the region beneath Scarpa's triangle. In a number of cases this has been a well marked symptom, but in a few cases has it been recorded.

As indicating the necessity for a more thorough early examination with the additional help of an X-ray plate, it may be remarked that there were 15 cases of fracture, which had been treated from 5 to 10 days before entering Bellevue, as bruises, sprains and rheumatism. Later careful examination demonstrated a fracture in each case.

MORTALITY. 10 patients died in Bellevue within the first week after admission,—5 of cardiac disease and 5 of pulmonary disease. The youngest who died in Bellevue was 58 years of age, and only two died under 60 years of age. Both were females. Seven patients, who were transferred to the island, died,—4 within two weeks, 3 within 6 weeks. Of these 18 who died within six months after the injury, 2 were between 50 and 60 years of age, 10 were between 60 and 70; 6 were over 70.

RESULTS. Of the 112 cases, 18 died; 32 have not been found (through moving from place to place); 30 are unable to work because of persistent impairment of function through pain; through restriction of movement at the hip on account of shortening and adduction; through the necessity of dependence upon crutches. Twenty-two show improvement. Twelve have abandoned their crutches and are walking comfortably with a cane, but at times with some stiffness and occasional pain. They are beginning to do some work. Ten have recovered almost completely; they are free from pain and stiffness, and are able to do their normal work. Ten are still in the hospital.

In searching through the histories and records of these cases it was interesting to learn that 34 cases or 30 per cent. had been brought to Bellevue from other hospitals after re-

maining in said hospital for less than one week. Furthermore of all the cases admitted to Bellevue, 54 cases or 50 per cent. were retransferred or discharged from Bellevue within fifteen days.

Considering that so many cases were accorded so brief and probably so unsatisfactory a treatment before being discharged or passed on to some other hospital, one might feel that there was some slight indifference to the future welfare of a patient suffering from fracture of the neck of the femur. One acute observer has written that "it may well be that treatment is perfunctory because the prognosis is bad and the prognosis is bad because the treatment is ineffective." There exists the general belief that definite treatment toward securing restoration of form and function is hazardous and of little avail. Authorities have stated that "our prognosis in cases of fracture of the neck must always be unfavorable," and also "if he escapes with his life he has to be contented with loss of function, loss of symmetry and equipoise, and he is often obliged to go about permanently crippled."

Scudder gives the following: "Results after Fracture of the Hip. Of especial value in this connection are the conditions existing in sixteen cases of fracture of the hip, many years after the accident. These sixteen cases were treated at the Massachusetts General Hospital by traction and immobilization, for periods varying from a few weeks to a few months. The patients then went about with crutches. No other treatment was used. Nearly all the cases were unimpacted either primarily or secondarily. At the time of the accident, seven cases were between forty-two and forty-seven years old, the remainder—with two exceptions, whose ages are not stated—were over fifty; three were over sixty years old. These cases reported for examination from two and one-half to twenty-four and one-half years after the accident. Thirteen of the sixteen cases have impairment of the functional usefulness of the leg; a weakness of the limb, necessitating a crutch in many instances; all movements at the hip somewhat restricted; atrophy of the muscles of the thigh, buttock, and calf of the leg;

a decided limp, requiring a cane; pain in the hip extending down the thigh even to the sole of the foot; pain at night in the hip; pain in going upstairs and in stooping over. In only two cases out of the sixteen could it be said that the leg was functionally useful."

These results are most unsatisfactory, and combined with the above similarly unfavorable results in Bellevue they explain somewhat the generally pessimistic views of the profession at large. In his latest volume an eminent authority writes,— "The attainment of the ideal object of treatment—restoration of form and function is rarely to be expected or *even sought*."

These unfavorable clinical results together with the opinions of the authorities quoted emphasize the words of Bardenheuer at the last German Surgical Congress when he stated the suitable treatment of fracture of the neck was the most difficult in the entire realm of fractures and also the one most unsatisfactorily treated.

Bardenheuer and Maxwell both have demonstrated that it was possible under their methods of combined lateral and longitudinal traction, to obtain better results than under the usual methods with side splint and longitudinal traction.

Appreciating the impossibility of obtaining success with the old time method and being unable to employ in Bellevue the apparatus of Bardenheuer I have used the method advocated by Whitman in 16 cases during the past 18 months.

Of these cases 5 were males and 11 were females. 9 cases were under 50 years of age; 3 were between 50 and 60; 4 were over 60. One was through the neck and not impacted; 12 were at the base, 7 were impacted. In 13 X-rays plates were made to corroborate the diagnosis.

METHOD. The following procedure was employed in the above cases. A careful examination was made of the patient's condition in order to determine the wisdom of giving an anæsthetic for a period of 20 minutes, this time being required for the application of the plaster bandage.

As soon as the anæsthetic permitted complete relaxation a gentle examination was made of the fracture, frequently

crepitus was found in those patients in whom impaction was thought to be present.

The patient was then lifted up from the table and placed upon a box or pillows about 8 inches high and large enough to support the head, shoulders and trunk. The pelvis rested upon a sacral support and the extended legs were held by assistants, one assistant holding each leg. Another assistant stood at the head to hold the patient by the shoulders and trunk when later extension became needed. The leg on the fractured side was then *gradually* abducted to the normal limit of about 45 degrees, the hip joint being held and supported by the hands of the operator. At the same time traction was being made to overcome the shortening by drawing down the leg as far as possible toward its original length as shown by previous measurements. The pelvis was prevented from tilting upward by simultaneously abducting the sound leg to 45 degrees, it thus serving to indicate approximately the angle at which the fractured leg should be fixed. Outward rotation is corrected at the same time by lifting up and supporting the upper end of the femur and rotating inward the leg.

The plaster spica was so applied as to include the pelvis and crossed below the edge of the ribs; this later permitted the patients to move about semi-reclining and to rise in bed without so much discomfort as when the bandage was carried up to the chest line. It was fitted closely about the pelvis, particularly about the trochanter and behind the articulation so as to give unyielding support to the fracture. Further the bandage was closely moulded about the patella and condyles of the femur and included the foot, thus preventing completely any outward rotation.

In order to render the plaster bandages as comfortable as possible folded cotton batting or sheet wadding was placed over all bony prominences and over this a flannel bandage, carefully adjusted, free from wrinkles or creases, avoiding all direct pressure over bony prominences. The plaster edges were trimmed and rounded so as not to come into contact with the skin.

DIFFICULTIES. It is difficult to apply the plaster bandage because it is necessary to have experienced assistants with sufficient strength to overcome the contractions of the strongly elastic muscles during the entire period required to apply the bandage, and it requires unusual steadiness and concentration of attention of the operator, and *each* of the three assistants to maintain the exact relation of the fragments; for unless the bandage be applied exactly it will be either inefficient to correct the displacement or uncomfortable for the patient.

In hospitals where there are many such fractures it would be advisable to have a table similar to that employed by Schede, upon which the patient can be satisfactorily held.

It was hard to make the proper abduction and at the same time to prevent shortening. It is very important to make abduction complete for as it exercises direct traction upon the capsule so it renders the capsule tense in front and below. As it supports the sides of the fragments it tends to force them into alignment, so it assists in correcting the malposition of the inner fragment and brings the two into contact.

In impacted fractures, passive abduction affords the most practical method of reducing the deformity without danger of widely separating the fragments.

In many of the unimproved patients it was found that their inability to walk without discomfort was due to a restriction of adduction. Adduction was marked and added an apparent to an actual shortening of the limb. It is very important to overcome the shortening which is almost always present in the majority of patients for this shortening is responsible for most of their later disability.

ADVANTAGES. It maintains complete immobilization during the period of repair, overcoming the shortening and adduction. The abduction prolonged during four weeks is of marked importance in aiding the future ability to walk without impairment or limitation of motion. It further relieves the patient from much unnecessary suffering on movement and renders him far more comfortable.

TREATMENT. The aim of the treatment should be the

restoration of the normal function of the hip joint and in order to accomplish this result the normal anatomical form must first be restored. The same principles which are necessary to produce success in the treatment of fractures in other situations must also be employed here. In another group of cases, which is fortunately small, the age and weakness of the patient are so marked that only such expectant or palliative treatment should be considered. It is not difficult for the surgeon to decide upon the conservative method in these cases. It is desired to suggest the plaster bandage method for the larger number of younger and more robust patients for whom our results would indicate it to be desirable and applicable.

As the chief point to be sought for is to endeavor to obtain the complete or approximate restitution of the normal anatomical figuration of the bone so it becomes necessary to overcome the displacements of the fragments. As we have no power at all over the proximal fragment so we must endeavor to bring the peripheral fragment, the peripheral portion of the femoral neck into the prolonged axis of the central fragment. The upper end of the distal fragment, the trochanter major is drawn upward by the action of the gluteals and rectus femoris in front; by the biceps, semitendinosus and semimembranosus behind; it thus becomes deviated upward, inward and backward (producing the shortening; the outward rotation is due to the mechanical weight of the leg, a result of gravity), hence it must be conducted forward, downward and outward. To accomplish this two forces are necessary, longitudinal and lateral traction. These have been used by Maxwell and Bardenheuer, and especially developed by Bardenheuer.

As has been shown, the larger number of fractures occur at the base and in most of these cases impaction is also present immediately after the injury. In many cases, however, this impaction is broken up and the fragments are separated when brought to the hospital,—especially Bellevue. In these unimpacted cases there has been no difference of opinion regarding the attempt to replace the fragments in their normal anatomical position. But in those cases in which impaction remains

there is a decided variance of opinion. It seems best after observing the good results obtained by Bardenheuer, Ochsner, Maxwell, Whitman and others to recommend that the deformity be reduced (while the patient is under the anæsthetic) by carefully separating, and unlocking, the fragments, not by tearing them asunder violently and harshly, but by carefully opening them as one would open a hinge.

Treatment should begin at once after the injury before the muscles have time to contract, and so displace the fragments. Each day's delay renders the reposition and reduction of the deformity so much the more difficult, and also permits the fragments to rub against each other, causing an increasing irritation which results in the production of an hypertrophic callus. Exact early reposition of the fragments decreases the amount of callus, and is indispensable for union in unimpacted fractures.

"At the present day our endeavor is not the production of so much callus, but rather as little callus as possible. When the fractured surfaces are in exact contact with each other along the entire extent nature does not need to supply much callus. Severe swelling about the fracture is always the expression of malposition of the fragments."

In Germany various surgeons, who have employed the extension method of Bardenheuer with such excellent results, recommend it so highly that it should be used here when circumstances permit. It will require experienced assistants who must be interested in its successful outcome.

RESULTS.—CASE I.—Male 45, moderately stout, alcoholic. Four days before admission he fell upon the left hip and was unable to move. He was brought to Bellevue, where a diagnosis of fracture at the base was made. There was $\frac{3}{4}$ inch shortening and outward rotation existed. He was given an anæsthetic, when crepitus was easily found. A plaster bandage was applied including the foot. At the end of four weeks he was allowed out of bed on crutches. At the end of six weeks the plaster bandage was removed below the knee. At the end of eight weeks the entire bandage was removed and he went about on crutches, without any

pain. At the end of three months he was doing well, still using crutches. At the end of four months he had abandoned crutches and was using only a cane. At the end of nine months he was at work. At the end of twelve months he had but $\frac{1}{4}$ inch shortening and was able to do his regular work as a mechanic. Sixteen months after the accident he is without pain or discomfort and has but $\frac{1}{4}$ inch shortening; flexion and abduction are practically normal.

CASE 2.—Male 65, large frame, well nourished. Four days before admission he slipped and fell upon the sidewalk, striking his right hip. He was unable to move and was treated for a bruise for three days. He was transferred to Bellevue where a diagnosis of fracture at the base was made; there existed marked outward rotation and $1\frac{1}{4}$ inches shortening. Crepitus was felt and fullness in Scarpa's triangle. Under an anæsthetic a plaster bandage was applied. He was confined to bed for four weeks, then allowed to use crutches daily. At the end of eight weeks the entire bandage was removed but he was not permitted to bear any weight upon the injured hip until the fourth month. At the end of six months, he used a cane only at times and was able to do work as a janitor. At the end of nine months he was in good condition, he could walk well without pain, go up and down stairs, and there was less than half an inch shortening; flexion and abduction are normal.

CASE 3.—Female 47, large and fleshy. Two days before admission slipped and fell upon the sidewalk, striking upon the right hip. She was unable to move and could not stand when lifted up. On entering Bellevue a diagnosis of fracture at the base was made. There were present outward rotation, fullness in Scarpa's triangle, crepitus, and $\frac{1}{2}$ inch shortening. Under an anæsthetic a plaster bandage was applied. At the end of five weeks the bandage was removed below the knee. At the end of eight weeks it was entirely removed and she was about on crutches. During the sixth month she used only a cane. At the ninth month she was able to do her normal housework without discomfort. She has no perceptible shortening; flexion and abduction are normal.

CASE 4.—Male 17. Two days before admission he fell down an elevator shaft, a distance of about five stories. He was unconscious, but recovered within the next twenty-four hours. There was found to be a fracture at the base. Outward rotation, and

1¼ inches shortening were present. Under an anæsthetic a plaster bandage was applied. At the end of three weeks the bandage was removed below the knee. At the end of four weeks he was out of bed using crutches. At the end of eight weeks he was using a cane. At the end of four months he was working on a farm. At the end of six months he was doing his regular work as a mechanic. At the end of one year there is but ¼ inch shortening, he walks with only a very slight limp, abduction and flexion are normal, and at no time has he any pain or discomfort.

The favorable results exhibited by these four patients at the end of six, nine and twelve months; the absence of deformity, pain and discomfort; the freedom of motion and their ability to resume their regular work, are undoubtedly due to the method of treatment employed.

Five other patients who have been under treatment for less than four months are up and walking on crutches. Six additional patients of less than two months' duration are not upon crutches. There is every reason to believe that the results in these cases will be as favorable as in those first reported.

In no case has it appeared that the patient was harmed by the application of this bandage. In no case did it produce pressure sloughs and require to be removed. In but a few early cases did it need to be cut away at the edges on account of injury to the skin. The plaster bandages were applied with great care and patience on the part of the House Staff to whose interest and effort much of the comfort of the patients were due. In a majority of the cases the plaster bandage was not applied until several days had elapsed after the injury. In six cases the patients had been under treatment in some other hospital before being transferred to Bellevue; four others had been treated at home for several days, and for other reasons this bandage was not at once applied. In only three cases was it put on within three days after the accident. Although the long side splints were in use, all these patients complained of pain whenever any movement was made—(in changing the sheets, in changing from one position to another, in lifting up to use the bed pan, etc.), the side splints did not

give sufficient support to prevent movement between the fragments.

However after the plaster bandage was applied the patients found they could move about without pain and could help themselves in many ways. The nurses appreciated the many advantages which the patients gained through the comfort of a well applied plaster bandage. In general the patients were far more comfortable than others with similar fractures but under the routine treatment with the long side splint and Buck's extension. From the hospital standpoint this method of treatment is less exacting in that the patients being more comfortable do not require so much time and attention from the nurses.

Conclusions.—1. Fracture of the neck of the Femur occurs under fifty years of age more frequently than was formerly believed.

2. Any injury to the hip followed by disability should suggest the possibility of a fracture of the neck, and requires an expert examination aided by an X-ray photograph.

3. Reduction of the deformity with complete immobilization of the fracture during the period of repair is advised by means of a plaster bandage in all suitable cases.

4. This is to be followed by *early* gymnastic movements, active rather than passive.

5. All weight bearing upon the fracture is to be avoided for from three to four months.

THE OPEN METHOD IN THE TREATMENT OF POTT'S FRACTURE OF THE LEG.*

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OF the great variety of fractures the surgeon is required to treat, that known as Pott's fracture, because of its close relation to the ankle joint, may be considered among the most important. Indifferent results following fractures of the various long bones, while often unsatisfactory, do not necessarily incapacitate the individual. In the instance of the ankle joint, however, and the so-called Pott's fracture, a very trifling deviation from a perfect re-alignment, oftentimes—we may say always—works to the disadvantage and discomfort of the individual, by virtue of the constant and exacting use required of the joint. Thus it becomes imperative for the surgeon, not only to apply a perfected knowledge of the normal relations of the parts that he may correct the pathologic arrangement produced by the injury, but also to affect a return to the normal in such manner as will insure permanency until rendered unnecessary by natural repair.

Pott's fracture is by no means a recent conception, for so long as man has existed has he been heir to this injury. And our knowledge of its pathology has come down through the medical ages hand in hand with our knowledge of anatomy.

The injury, itself, is best described by the manner of its production. Eversion of the foot is necessary. The strain is first manifested in tension on the internal lateral ligament, either in the ligament itself, or its points of bony attachment. As is usual in the test between bone and ligament, the bone

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gives way; affecting in this injury a separation of the malleolus, or a portion of it, from its parent body, the tibia. In addition, the tendon of the *tibialis posticus*, passing posteriorly and inferiorly to the malleolus, is not infrequently torn from its compartment in the annular ligament and displaced forward and upward. This is very important. The force continuing, pressure is exerted on the inner aspect of the external malleolus. This portion of the fibula being comparatively large and strong and, as in the case of the internal lateral ligament, the fibrous attachment of the fibula to the tibia even stronger, the stress is carried to the slender part of the fibula 7.0 cm. above the tip of the malleolus. This gives way, and in this manner is caused the second element of a Pott's fracture. If the force be great enough, the fracture of the fibula will be followed by a laceration of the inferior tibio-fibular ligament, or, more likely, a separation of the outer lip of the articular surface of the tibia. With the exceptions of the rupture of the annular ligament on the inner side of the ankle joint and the dislocation of the tendon of the *tibialis posticus*, this is what most authorities concede to be a typical Pott's fracture.

The philosophy of the treatment of this fracture is well understood and universally recognized, except by an occasional radical who advocates early passive motion and kindred methods. As advised by our fore-bears in practice, it consisted in reduction and the maintenance of reduction, and will always unalterably so be. It is axiomatic that injured nature demands rest, and given rest is amply able to care for herself. This is plea sufficient.

Methods and means of untold variety and quantity have been introduced from time to time. And it may seem strange, but the early methods have stood the test of experience. This is quite in contrast to the progress made in other lines of practice. There are two reasons for it.

First, and in the spirit of an eulogy for the grand masters of the past, the original basic principles, as worked out by them, were correct—reduction and fixation. The devices, which they in their ingenuity contrived, were as good for the maintenance

of reduction as external appliances well can be, and in their splints early was the acme of progress reached. Simplicity was theirs. Modern adaptations have not changed the principle of fixation, nor the means. They have merely served to complicate the appliance and incumber the injured leg.

Second, and with due respect, these cases are too often treated medically when they should be treated surgically. There is yet a pre-Lister fear advising against opening injured joints, or cutting down on broken bones. However, the trend of recent times, encouraged by asepsis and the now recognized natural immunity of tissues, is to operate. Kelly, Martin, Vaughan and others are doing this over a wide range of fracture cases. While not advocating the radical use of surgical treatment in all fractures, we do suggest it here as the best means to reduce, and to maintain the reduction of, the Pott's fracture.

The successful issue of a Pott's fracture depends very largely upon the return-ability of the broken tip of the internal malleolus to its original position, in perfect approximation to the tibia. The slightest bit of tissue intervening means imperfect apposition and consequently imperfect union. It is true there may result an apparently perfect union, but it is, in that event, fibrous, and a fibrous union in this location, bearing as it does its share of the strain imposed on the arch of the foot, will not stand the test of use. Supporting this is the lack of confidence in the closed methods of treatment as manifested by the text-books. They are full of suggestions for the correction of faulty unions.

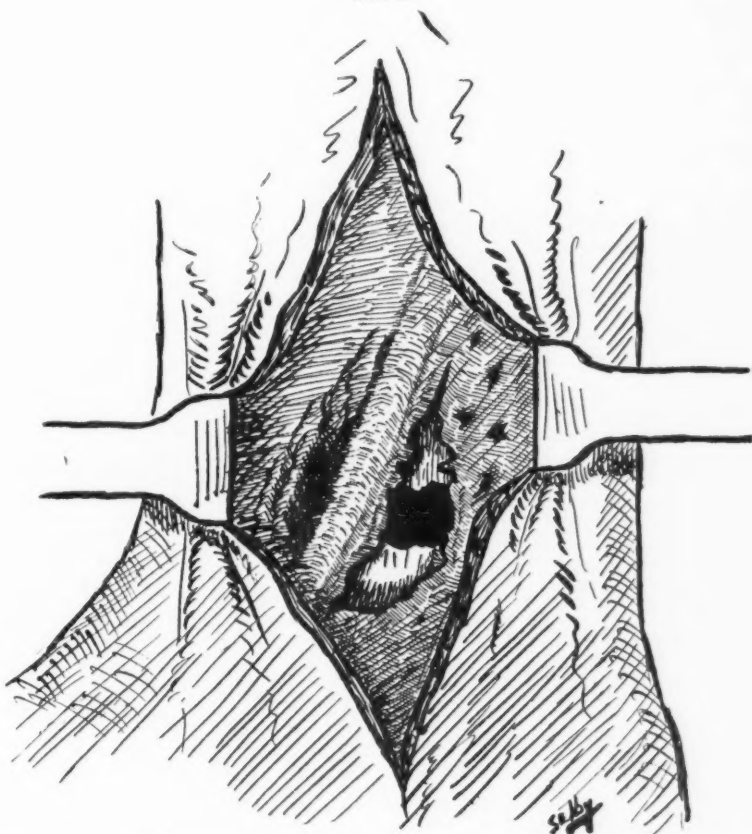
Not only is perfect union virtually insured when the fragments are sutured in place, but also the pain, so annoying to both patient and surgeon, in large measure prevented. In as much as this pain is due more to the impaling of nerve and muscle on the sharp points of fragments not wholly reduced than the trauma of the injury, this is consequently a very worthy argument in favor of the operative treatment.

The unfortunate and discouraging sequel of flat foot is obviated by the return of the tendon of the tibialis posticus to

its normal position in the annular ligament permitted by the open method.

Swelling is likewise largely done way with. Experience has demonstrated the very considerable hemorrhage a Pott's fracture induces in and around the joint, and it is reasonable

FIG. 1.



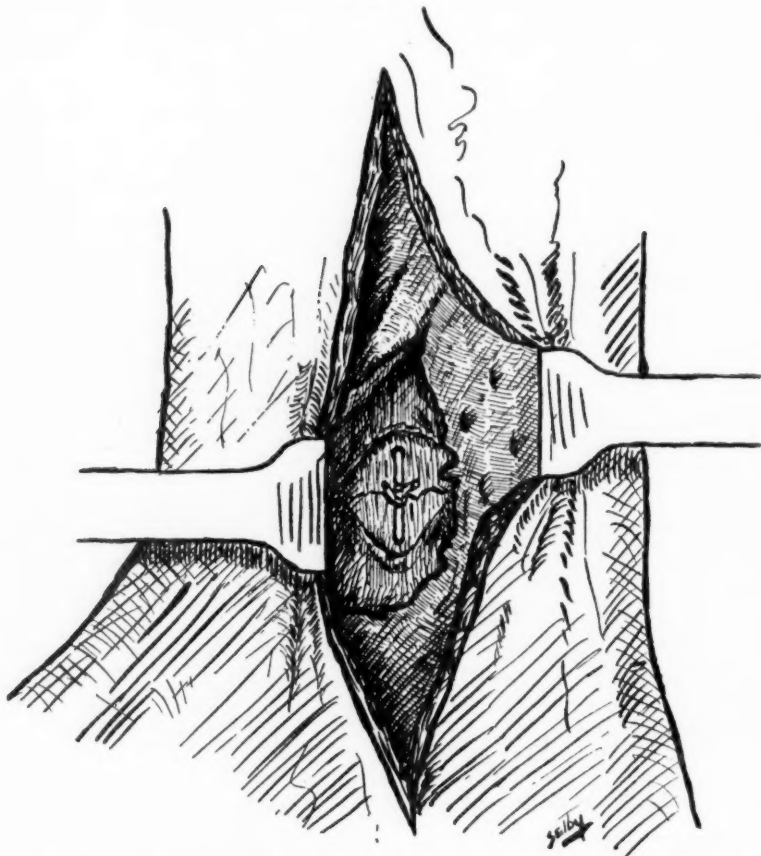
Shows forward displacement of the tendon of the tibialis posticus and the separation of the malleolus from the tibia.

to infer that swelling is consequent to this. It is a granted fact that increased tissue tension is an inevitable cause of pain. Likewise does it diminish the local resistance and hinder the natural power to heal. Hence, removal of the extravasated blood is indicated, and a judiciously—mark you, judiciously—

placed drain becomes a satisfactory adjunct to the suturing of the bones and the returning of the dislocated tendon.

In order to illustrate the desirability, we may say the necessity, of having an improved method for the treatment of

FIG. 2.



Shows the malleolus sutured in place, the tendon of the tibialis posterior being retracted.

the Pott's fracture cases, the two following reports have been abstracted from our records:

CASE I.—July 20, 1904, M. V. stepped on a round piece of iron which by rolling caused the ankle to turn. There was no apparent deformity, but passive abduction produced pain at the internal malleolus and demonstrated abnormal mobility. Pres-

sure over the fibula above the external malleolus caused pain, but elicited no crepitus. He was removed to St. Vincent's Hospital, where the usual fixation dressing was applied. At the end of six weeks and in spite of conscientious care, this ankle was found thickened and the arch of the foot fallen, with ankle and foot functions impaired.

CASE II.—January 5, 1906, J. S., age 24, had his left ankle squeezed between a falling timber and a large block of wood. He was immediately taken to St. Vincent's Hospital, and examined under ether anæsthesia. Fractures of both the internal malleolus and the fibula were easily demonstrated. Having reduced these fractures, fixation dressings were applied with the foot in marked inversion and adduction. At the expiration of eight weeks there was still considerable swelling, but there was apparently firm union. However, when put to the test, abduction was found to be discouragingly developed and the foot disgustingly flat.

The results obtained in these two cases are not rare. It is safe to assume that all surgeons of large experience have recorded on their history sheets cases of similar nature and like result. Nor should the blame attach to the operator; rather should we look to the method. With this in view, we began casting about for a method that carried with it a greater element of accuracy in the reduction of the malleolar fragment, for herein, may it be conceded, lies the fallacy.

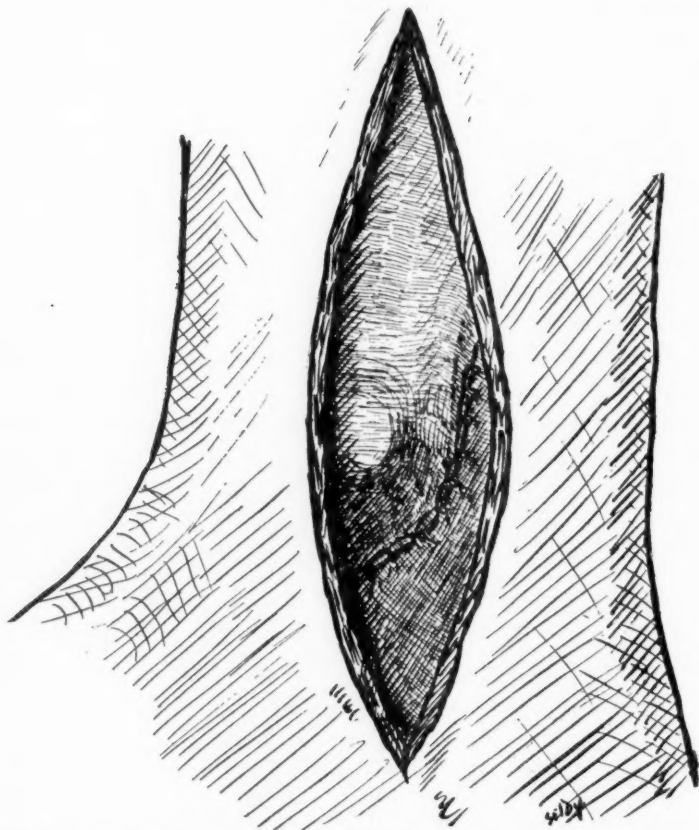
The growing popularity of the open treatment of fractures elsewhere, with apparently increasingly satisfactory results, determined its adoption in the treatment of our Pott's fracture cases. The first case so treated is detailed as follows:

CASE III.—June 29, 1906, J. S., age 64, while passing a moving crane, was struck on the outer aspect of the right leg just above the external malleolus by a large bar of iron. The result was an outward and backward displacement of the foot. A first aid dressing was applied at the plant and the man removed to St. Vincent's Hospital.

Examination.—Ether anæsthesia was employed and when fully established the temporary dressings were removed. The striking features were marked outward and backward displacement of the foot with a sharply defined prominence in the region

of the internal malleolus. This deformity served to draw the skin on the inner aspect of the ankle so tight as to render perforation by the sharp prominence beneath imminent. Palpation demonstrated this projecting bone to be the lower end of the shaft of the tibia with its fractured edge, from which the malleolus had been severed. The malleolus was found 4 cm. inferior and

FIG. 3.



Shows the suture of the annular ligament, which replaces the tendon of the tibialis posticus.

exterior to this edge, and freely movable. By some effort, the malleolus could be brought into its proper position, but would not so remain. The very considerable swelling about the ankle was regarded as being due to hemorrhage, and this was verified at the operation. The fibula was fractured 8 cm. above the tip of the external malleolus.

Operation.—The entire leg to the knee was prepared as for an abdominal operation, but with, perhaps, even greater care. The incision was made where best it would expose the malleolar fracture and was longitudinal, extending from the lower border of the malleolus upward over the shaft of the tibia to a point 5 cm. above the fracture. The skin proved to be the only sound tissue covering the bone at the seat of the fracture, and its incision was followed by a startling gush of blood, the accumulation within the joint. The joint having been emptied, bleeding was at no time excessive, though there continued rather free oozing from the lacerated tissues. That portion of the annular ligament through which the tendon of the posterior tibial muscle passes was torn from its bony attachments, permitting the escape of the tendon and its dislocation, if we may use the term, anteriorly. It was not necessary to develop the field, except for light retraction of the skin, which proved sufficient to expose the bony fragments. No effort was made to flush out the joint. In fact particular care was exercised that nothing should be brought in contact with the joint surfaces. The displaced malleolar fragment was brought upward into its proper position, and there held by an assistant. Holes were drilled in both the tibia and the malleolus, beginning in each instance in the middle of the exposed surfaces about 2 cm. from the line of the fracture and carried to the fractured surfaces to points well toward, but not involving, the articular surfaces. Through these holes a medium sized silver wire was drawn and the ends sufficiently twisted to make perfect the apposition of the malleolus to the tibia. Anticipating the possible necessity of removing these wires later, the twisted ends were not buried, but were permitted to remain accessible. The anatomical relations of the lacerated annular ligament were then reestablished, using a running, over-cast suture of chromic catgut No. 1. Between the sutures and down to the bone, a roll of rubber dam was inserted for the purpose of twenty-four hour drainage. The skin was closed with the usual interrupted silk worm gut suture and a large bichloride dressing applied. The perfect reduction and retention of the malleolar fracture seemed to correct the fibular displacement, so the fracture of that bone was not treated by operating. The usual splints were applied.

Subsequent Course.—On the second day the drainage was removed. That the drainage had served its purpose was evi-

denced by the saturation of the dressings. In connection with this, it is interesting to note the patient had but slight pain, having passed a comfortable night.

On the seventh day the cutaneous stitches were removed, and at this time the patient was able to move the ankle quite freely and without pain.

During the fourth week, the patient complained of severe pain in the leg, which became quite swollen and hyperesthetic. The silver wire was apparently the source of this trouble as it promptly subsided on the removal of the wire. Some fear was entertained lest union prove lacking in firmness. This, however, was not the case, and the result was in no wise influenced.

By the sixth week, the man was bearing some weight on the foot, and by the eighth was walking about with a cane. Owing to his advanced age, we had some doubts as to the propriety of allowing him to do this, even though union was seemingly complete. However, no untoward result followed.

Condition at Time of Discharge.—September 11, 1907. The anatomical and functional results were perfect, as manifested by the ability of the old gentleman to walk without limping; and, furthermore, he was free from pain.

CASE IV.—Our second case is reported in abstract, chiefly for the sake of emphasis. Oddly enough, this was in a youth of sixteen years, quite in contrast to the age of the first patient.

July 10, 1906, R. C., age 16, had his right foot caught and twisted between two pieces of iron causing an outward and backward displacement. Examination under ether anæsthesia at the hospital demonstrated a typical Pott's fracture. After a careful preparation, an incision was made over the internal malleolus, disclosing a tear in the annular ligament with an anterior displacement of the tendon of the tibialis posticus and the separation of the malleolus from the tibia. The malleolus was restored and sutured with chromic catgut No. 4, the annular ligament with chromic catgut No. 1 and the skin with interrupted silk worm gut. A twenty-four hour drain of rubber dam was inserted between the stitches to the bone and a bichloride dressing of generous dimensions applied. The leg was placed in the usual fixation dressing. The convalescence was rapid and most satisfactory, and by the eighth week the young man had returned to his usual occupation.

Though we have other cases we have treated in this manner, and as satisfactorily as the two reported, we do not feel that the value of this paper would be enhanced by further details. We are frank to confess that the total number of our cases, were they tabulated, would make data far too meager to justify conclusions. Consequently, we present these two cases as a preliminary report, pending further investigation. There are, however, a few points relative to the method which deserve emphasis, and they are as follows.

The first is a word of caution concerning the preparation of the injured part for the operation, and we rather hesitate to speak of this as there is no surgeon who is not fully alive to the dangers of carelessly approaching joints. It were far better to have an occasional flat foot to one's credit than a single patient the amputation of whose infected limb became necessary to save his life. For such a weighty reason, we offer a rule, that if there be the least doubt as to the ability to secure an aseptic operation (under no circumstances operate outside of an operating room that is true and tried) do not operate. The preparation of the leg itself should be conducted with even greater care than that exercised in preparing the abdomen for operation. But these are well known facts, and extended reiteration is not necessary.

Our first case developed an interesting feature in the pathology of the fracture, and that is the displacement of the tendon of the *tibialis posticus*. It is a well known anatomical fact, that this muscle is one of the essential supports of the arch of the foot. Having been displaced to its pathological location in front of the malleolus, and this happens by virtue of the forcible change in location of the malleolus, the tendon lies lax, thus failing in its function. Its replacement by external manipulation is obviously impossible. This, of course, argues for the open method.

As to the material used in suturing the fragments, that is largely a matter of choice with the operator. The chromic gut seems to be sufficient, however, and has the added advantage of seldom being a source of subsequent annoyance.

PUNCTURED FRACTURE OF THE SKULL.*

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Assistant Surgeon to the German Hospital; Surgeon to the Germantown Hospital.

THE case herewith reported, as the basis of this paper, is unusual in many ways. It offered diagnostic difficulties which were completely solved only at the post mortem table, and has many points of interest, clinically, pathologically and in a legal way.

ADOLPH H. Age 21.—On October 4, 1906, patient was seen by Dr. L. Demme Bauer. He gave a history of having been struck about the right eye with an umbrella, five days previously, on September 30th. The patient complained of a great deal of pain over the right temporal region, and of general malaise. He was entirely rational and answered questions intelligently. Physical examination showed that the right eye was the seat of a conjunctivitis, and the eyelids were puffy. There was no discoloration, ecchymosis or external evidence of any abrasion, in or about the eye. Both eyes reacted normally to light and accommodation, and the pupils were equal. The tongue protruded in the median line, and the naso-labial fold on either side unaffected. The temperature was 102° F., pulse 90, respiration 18. In spite of the fever there was an unusual coldness of the body. A boric acid lotion was ordered for the eye.

On October 5, 1906, the patient was again seen. His mental condition was still good, but the malaise was more marked. There was no paralysis of the extremities. The temperature was 102°. He was removed to the German Hospital in the afternoon.

Patient is a well-nourished and well-developed German lad. He is in a stuporous condition, and answers questions slowly and incoherently. He lies upon his back, with his eyelids closed, and desires not to be disturbed, but occasionally tosses his head from side to side. He complains of chilliness, and a great deal of tenderness over the right temporal region. There was no evidence of alcoholism or uremia.

* Read before the Philadelphia Academy of Surgery, October 1, 1907.

The head was carefully examined, and no evidence of fracture was detected. There were no cuts or bruises on the scalp. There was no discharge from the nares or from either external auditory meatus. There was no oedema over either mastoid. The tongue was protruded in the median line, without tremor. There was no facial paralysis. There was no cyanosis of visible mucous membrane on the lips, or of the finger tips. The right eye showed slight injection of the bulbar conjunctiva, but there was no evidence of injury to the eye. Both eyes reacted normally to light and accommodation and there was no irregularity of the pupils. The sclera was not icteroid.

The chest, heart and lungs were negative. The pulse was slow and regular. The abdomen was negative. The patient having been sent in with a suspicion of enteric fever, was examined very carefully for enlarged spleen and spots, and for a history of nose bleed, all of which were negative. The extremities could all be moved. The superficial and deep reflexes so far as examined were unaffected. Temperature, 99.2-5°; pulse, 64; respiration, 22.

A catheterized specimen of urine, 570 c.c., had a reddish-yellow color, acid reaction, specific gravity 1038, faint trace of albumin and many amorphous urates, but no tube casts.

At 12 o'clock midnight, October 5, 1906, the temperature was 102.2-5°, respiration 24, pulse 64. During the night the patient was very restless, talking constantly and complaining of a great deal of pain in the head. He passed 1060 c.c. (35 ounces) of urine during the first twenty-four hours in the hospital. October 6, 1906. Leucocyte count 15,900.

October 7, 1906. About 10 A.M. it was noticed that the right pupil was more widely dilated than the left but still reacted to light and accommodation. No evidences of paralysis were yet found, but a tentative diagnosis of cerebral pressure was made, the possible causes considered being either depressed fracture, a clot from rupture of some portion of the meningeal artery or its branches, or a collection of pus. The diagnosis of cerebral abscess was suggested by the intermittent temperature, leucocytosis, and the chilly feeling of the patient.

The X-ray of the skull showed a shadow which was interpreted as a fissured fracture of the vertical plate of the frontal. This opinion was not positive. The patient grew worse, and on

the night of October 7th, became very delirious, and tried to get out of bed. Morphia $\frac{1}{8}$ gr. was given and quieted the patient.

October 8, 1906. Patient had become quite comatose and the right pupil was widely dilated. There was no paralysis of either arm or leg. The patient's condition in other ways was as twenty-four hours before.

An eye examination was made by Dr. Wm. T. Shoemaker. O.D. and O.S. react to light and accommodation. O.D., dilated pupil. O.S., normal pupil. Ophthalmic examination. O.D. shows slight obscuration of disc. No hemorrhage into retina.

Soon after this examination was made it was noted, that while the patient was moving his right arm and leg, the left arm and leg were limp by his side. One hour before this, however, the resident physician saw the patient move his left arm and leg, and a patient in the adjoining bed saw him attempt to get out of bed, using his left arm and leg in doing so. An examination showed a complete left-sided hemiplegia. The indications of intracranial pressure were now unmistakable, and operation for relief was decided upon and performed about 5 P.M., October 8th.

Operation.—October 8, 1907. Ether anæsthesia. A curved incision, with its center over the most prominent part of the parietal eminence, was made. It started some distance behind the right ear, and was carried upward and forward. The tissues were divided down to the bone. A one-inch trephine opening was made over the most prominent part of the parietal eminence, and was enlarged with a rongeur forceps. The dura bulged into the wound. It was opaque, non-pulsatile, and dark underneath. The dura was incised, and a large abscess of 150 to 200 c.c. of dark, foul-smelling pus evacuated. The brain then came down into the opening and pulsation became evident. The abscess cavity was carefully and thoroughly wiped out with gauze sponges.

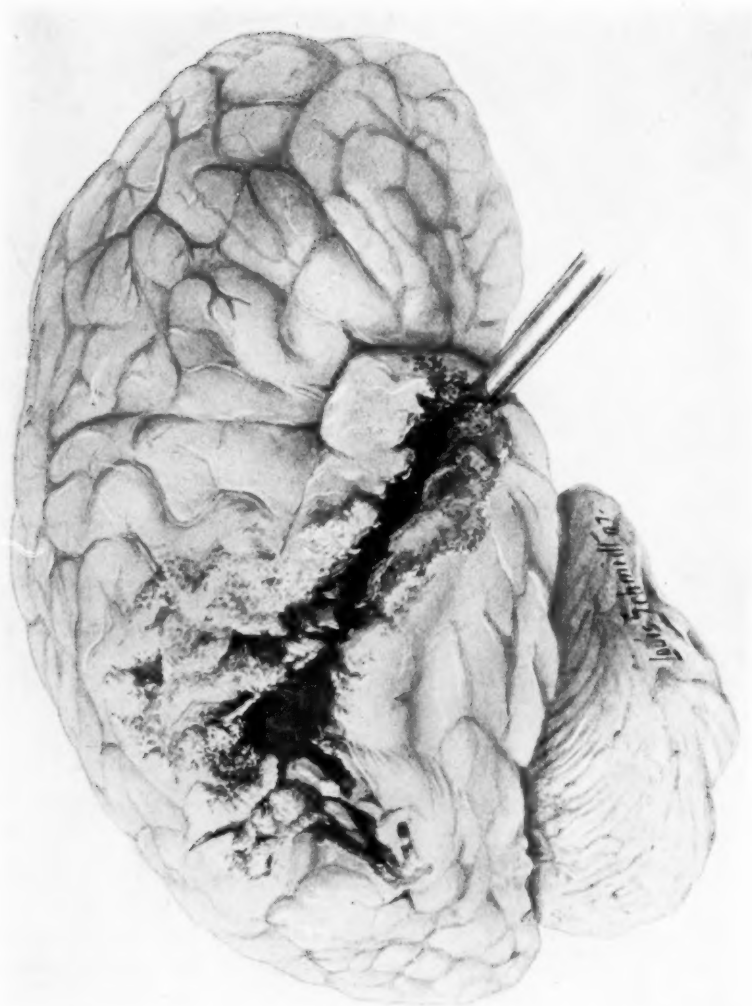
Three pieces of iodoform gauze were placed in the abscess cavity for drainage, the ends being brought out of the opening. The skin wound was closed with interrupted sutures of silk-worm gut, room being left for gauze drainage to come out. An anti-septic dressing was applied.

After coming out of the ether the patient was semi-conscious, could be aroused with little difficulty, and had periods of restlessness alternating with stupor. Such was his condition all of the



FIG. 1.

FIG 2



next day, October 10th. The right pupil was dilated and did not respond to light. The left side still paralyzed. The outer dressing was changed and the wound was found to be discharging freely.

October 10th. In the morning the patient was improved. He answered questions in a fairly rational way; his pupils were equal and reacted to light and the paralysis of the left arm was not so profound.

At 10.25 A.M. the patient suddenly stopped breathing and became deeply cyanosed. The pulse remained full and strong for two to three minutes after breathing ceased. Artificial respiration was performed without avail and the pulse gradually weakened and stopped.

Post-Mortem Examination.—The face and head presented no external evidences of injury. There was no ecchymosis or swelling about the eyes or forehead.

The skull cap was removed and the brain exposed. A large abscess cavity, about the size of a large orange, was found in the right temporo-sphenoidal lobe. An investigation of the middle fossa showed a fracture of the greater wing of the sphenoid, a little below and to the outer side of the outer end of the sphenoidal fissure. Several loose spicules of bone were removed and the fracture opening was found to be nearly circular. The right eye was removed, exposing the floor of the orbit. A fissured fracture, with a loose fragment of the bone, was found opening the roof of the antrum of Highmore. The antrum was full of pus, and showed a fracture of the inner wall into the nose. The line of penetration was then from before backward, from nose to antrum, antrum to orbital cavity, and thence to the middle fossa of the skull, thus furnishing an avenue of infection direct from the nasal cavity to the temporo-sphenoidal lobe of the brain. A straight probe could be made to traverse the entire tract without obstruction.

The instrument of penetration had traversed the fatty bed of the eyeball and had not infringed upon or in any way injured the eyeball, its vessels or nerves, thus accounting for the lack of ecchymosis or permanent swelling. (Figs. 1 and 2.)

A septic embolus having the appearance of a chicken fat clot, and about the size of a small bean, was discovered in the floor of the fourth ventricle. This explains the sudden death

from respiratory failure. There was no evidence of any intracranial hemorrhage, either extradural or subdural. The inner wall of the mastoid cells seemed normal and intact. The rest of the body was normal in every respect.

In looking over the literature of Punctured Fractures of the Skull I have failed to find a similar case. The vast majority of punctured fractures of the skull are, as would be expected, the result of bullet wounds received in battle, and come under the hands of military surgeons. The majority of these cases are instantly fatal or live so short a time that secondary results do not supervene. This is particularly true of wounds caused by the modern high velocity bullets, the injury to the brain in these cases being highly destructive. In civil life the wounds are caused generally by other instruments or by low velocity fire-arms. Here the skull offers enough resistance to take up most of the energy, with the consequent low grade of injury to the intracranial organs, and hence these cases often survive the injury long enough to permit of the development of hæmorrhage and infection. These are the two great dangers of punctured fractures in those cases which do not succumb at once. The hæmorrhage is most often subdural. The infection may involve the cerebrum, the meninges or both, and any portion of the brain may be the seat of an abscess.

In a series of 316 cases of foreign bodies in the brain analyzed by Dr. Henry Wharton in 1879¹ a number of cases of punctures by objects other than bullets are recorded. Gun-shot wounds of the skull and brain I have not attempted to include in this summary of the literature. In Dr. Wharton's series there were stab wounds by swords and bayonets, and wounds caused by the ferrules of canes and umbrellas. Five cases of penetration of the sphenoid bone are recorded, and 18 of wounds of the orbit.

Since that time numerous cases have been reported.

Brown and Birch,⁹ Ferguson,¹⁰ Lemonnier,²⁸ Fisher,¹¹ H. M. Holmes,¹³ Mac Kellar,¹⁶ Wilson,¹⁸ Beckwith,¹⁹ Taylor,²⁰ D'Cruz,²² Schmid,²⁴ Odell,²⁵ Batut,²⁸ and Kennedy,²⁹

have reported cases of simple puncture of the skull, not followed by abscess.

Felty,² Rehm,⁵ Glasgow,³³ Mandel,²³ and P. Ross,²¹ have reported punctured fractures of the skull followed by cerebral abscess.

Griffith³⁰ has reported a case of cerebellar abscess following puncture of the skull and brain.

Dutra,⁶ Laplace,⁷ A. S. Holmes,¹² Jewett,¹⁴ Lusk,¹⁵ Prideau,¹⁷ and Grekoff,²⁷ have reported punctured fractures through the orbit with brain injury but not followed by infection, while Builer,⁸ and Lee,⁴ reported similar injuries followed by abscess and meningitis.

Randall has reported a case (quoted by Spiller) of perforation of the ethmoid through the nose by the rib of an umbrella, with secondary cerebral abscess. I reported a case to this academy last year, of a puncture of the vertex of the skull in which the superior longitudinal sinus was opened. The case recovered, and there was no infection. I also know of another case in which the olfactory plate of the frontal was perforated by the rib of an umbrella which entered the nose. This case was fatal.

In practically all of these cases the diagnosis of the primary and secondary conditions was made easy by a knowledge of the injury and local evidences of trauma. In the case here reported, however, we did not have these facts to guide us. The history, in itself meagre, was misleading, as no indication of an injury to the nares was present on superficial examination. The diagnosis of a cerebral abscess could not be made with certainty. At best the recognition of this condition is a matter of difficulty.

There is no symptom or combination of symptoms pathognomonic of brain abscess, therefore in the absence of a recognized fracture, middle ear infection or suppuration elsewhere in the body, its diagnosis must be doubtful.

Spiller, Penn. Med. Journ., Oct., 1906, P. 30, says: "The diagnosis of cerebral abscess depends chiefly upon the signs of some more or less rapidly developing lesion of the brain, with

the discovery of a purulent process somewhere else in the body or of a wound of the head." Note the qualifying clause.

Von Bergman states that marked symptoms of localization, provided they are accompanied by headache and fever, constitute the most important signs of cerebral abscess. He also lays great stress upon the condition of the skull wound, when one is present, and upon the flow of the pus from the fissure in the skull or from between the fragments of a comminuted fracture.

Leucocytosis of course may aid us in the diagnosis of abscess, as may also at times the presence of choked disc—not found, however, in the case I here report. The main features upon which we had to form our opinion in this case were:

1. Pain in the right temporal region.
2. Tenderness in the right temporal region.
3. Leucocytosis.
4. A persistent feeling of cold.
5. The intermittent temperature.
6. Persistent slow pulse.

The factors which operated against the establishment of a positive diagnosis were: 1. Existence of fracture without external evidence of injury. 2. Delay of paralysis until the abscess was large enough to cause pressure on the motor area. 3. Absence of choked disc.

The diagnosis was not made definitely and this is not surprising in view of the facts. The operation was undertaken primarily for the relief of intracranial pressure.

Granting that the existence of an abscess or of other serious intracranial complications can be established, operation is of course indicated, and indeed operation offers us a better chance in punctured fracture of the skull when the signs of intracranial lesion are not well marked, or even absent. In making this statement, I am taking into consideration the great mortality in fractures of this kind especially when they traverse the orbit. In Dr. Wharton's series, 17 of the 18 cases of orbital penetration died, although it is stated by him that "in many cases the persons were unconscious of the injury and the unfavorable symptoms developed suddenly."

Therefore it is a wise procedure to open the skull at the

wound of entrance at the earliest possible moment after the accident, irrespective of symptoms or lack of symptoms. The fatality of brain abscess or septic meningitis is so great that any procedure looking toward prevention is imperative. When as in this case, the history of the injury is vague and no wound of entrance can be found, the indications for early operation are not so positive.

In conclusion, I would call attention to the wisdom of nose examination in any case of traumatism about the head when the history is at all doubtful or undetermined.

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TRANSACTIONS

OF THE

NEW YORK SURGICAL SOCIETY.

Stated Meeting, Held October 9, 1907.

DR. JOSEPH A. BLAKE in the Chair.

PRIMARY CANCER IN ACUTELY INFLAMED APPENDIX.

DR. CLARENCE A. MCWILLIAMS presented a single woman, 20 years old, who was admitted to the Presbyterian Hospital on September 5, 1907. She had landed in this country only two days before, and was brought to the hospital from Ellis Island. She had been sick with right abdominal pain for 3 days. Her temperature on admission was 101; pulse, 100; she was vomiting and complained of a pain in the right iliac fossa, where a tender mass, about the size of a lemon, could be felt over the appendix. This was her first attack, never having been sick before in her life in any way.

An immediate operation was done, the abscess containing three ounces of pus being opened and the appendix situated in the pelvis delivered in the ordinary way. It seemed to be swollen, acutely inflamed, with a small perforation at the base and clubbed at its extremity. The patient made an uneventful recovery.

Pathological examination of the appendix. Specimen is 7 x 1½ cm. On gross examination all the layers seem hypertrophied. Peritoneal coat is darkened and bloody. Lumen contains muco-pus and a few enteroliths of small size. At the tip the lumen is entirely occupied by a hard mass about the size of a pea.

Microscopical examination. The epithelial layer is mostly intact. The submucosa and muscularis show not only chronic productive inflammation but they are also at the tip infiltrated by an epithelial growth having the histological character of scirrhous

cancer. The columns of cells in the central tumor pass outward and split up the muscular fibres. They involve the subperitoneal tissue but not the peritoneal coat. The cells are spheroidal shaped and show no mitotic figures, indicating slow growth.

Dr. McWilliams said that up to June, 1906, 42 cases of undoubted malignant tumors of the appendix had been reported. Of these acute inflammation was found in 13 cases, obliterating appendicitis in 11 and concretions present in only 3 cases. Of these 42 cases, 37, or 88 per cent., were cancer, 3 were endothelioma and 2 were sarcoma. Since the above report he has been able to find 8 additional cases, making 50 in all. These were as follows: 1 case, Libman, *Proc. N. Y. Path. Soc.* 1906, No. VI.; 2 cases, Mandlebaum, *Proc. N. Y. Path. Soc.* 1905; 1 case, Mason, *Boston Med. & Surg. Jour.* Jan. 10, 1907; 1 case, Eccles, *Amer. Jour. Med. Soc.* 1906, 131, p. 966; 2 cases, Hartman, *Bull et Mem de Soc. de Chir. de Paris*, 1907, March 12, p. 228; 1 case, Nelaton, *Bull. et Mem de Soc. de Chir. de Paris*, 1907, March 12, p. 228.

Routine microscopical examinations of all removed appendices will undoubtedly reveal cancer of the appendix to be more numerous than has been supposed to be the case. Its development also in appendices diseased previously by either acute or chronic processes would indicate the advisability of removing the organ when it is known to be once damaged.

OPERATION FOR ANCHYLOSIS AT THE SHOULDER JOINT.

DR. ROYAL WHITMAN presented a girl fifteen years of age who came to the hospital five weeks ago for pain and stiffness at the right shoulder joint, of ten years duration, apparently due to tuberculous disease. He had removed the head of the humerus and the diseased portion of the scapular articulation, and had then interposed a flap from the deltoid muscle. The objects of the operation were first, to relieve the pain and second to restore a certain degree of motion. Both were apparently accomplished.

In this case Dr. Whitman said the head of the bone was diseased and adherent to the scapula. Mobility after excision depended more upon the amount of bone removed than upon the interposition of tissue. In this instance only the articulating extremity of the humerus had been resected in order that the contour of the shoulder and the muscular attachments might be preserved, a large flap was interposed to prevent readhesion.

DR. JOHN F. ERDMANN said that some years ago he reported three cases of excision of the shoulder joint for ankylosis in which the results were very satisfactory. In those operations he did not interpose any muscle flap.

EPIPHYSEAL FRACTURE OF THE NECK OF THE FEMUR.

DR. WHITMAN presented a girl fifteen years of age who was admitted to the hospital about ten weeks ago. The symptoms were, as is the rule in fractures of this type, originally incomplete, limp and pain for several weeks terminating finally after a slight injury in complete disability. She was sent to the hospital with a diagnosis of hip disease. There was severe pain on attempted motion, the limb was rotated outward and practically fixed by muscular spasm. There was a fraction of an inch of shortening. The joint was opened by the antero-lateral incision which exposed at once the inner extremity of the neck of the femur which completely concealed the head of the bone separated and lying behind it. On removal of a thin section from the end of the neck, it was possible by the insertion of a chisel to separate the fragments and by rotating the limb inward to restore their normal relation.

There was now no pain, motion was practically unrestricted and perfect functional recovery might be predicted. The case illustrated the importance of a correct diagnosis which permitted operative intervention, for untreated the result must have been shortening, ankylosis and distortion of the limb.

FRACTURE OF THE NECK OF THE FEMUR.

DR. CHARLES N. DOWD showed a girl, 10 years old, who sustained a fracture of the neck of the femur about three years ago. There was no lameness, and no shortening could be made out at the present time. The child was able to run about and play as well as though she had not received the injury. The X-ray, however, still showed considerable deformity, consisting of a depression of the neck of the femur. That femur had, however, apparently grown more than the other and hence the legs were of equal length. The case was treated in March, 1904.

OBSERVATIONS ON THE TREATMENT OF FRACTURE OF THE NECK OF THE FEMUR.

DR. JOHN B. WALKER presented a paper with the above title, for which see page 84. In connection with the paper the author showed two cases of fracture of the neck of the femur.

DR. WHITMAN said that in the last edition of Hamilton's work on Fractures, he had recently noted a quotation from Robert Smith as to the prognosis in fracture of the neck of the femur, as follows: "In all the functions of the limb are forever impaired. Whether the fracture is within or without the capsule, whether united by ligament or bone, shortening of the limb and lameness are the inevitable results."

The two patients presented by Dr. Walker thus disposed of another tradition. The speaker said that for the past eighteen years he had been writing papers and presenting cases to prove that this accident was not uncommon in young and vigorous subjects. He had seen upwards of forty cases of fracture of the neck of the femur in childhood, and many cases in young adults. The neck of the femur was a weak point, and it might be broken by slight violence if advantageously applied. Until these facts were accepted by teachers this fracture would continue to be overlooked in the most favorable class of cases by those who had the opportunity to make the diagnosis when effective treatment might be applied. He was particularly interested in cases of this class. For example, the incomplete or impacted fracture at the base of the trochanter was supposed to be relatively common in young subjects. The present teaching was that no treatment should be employed other than to prevent disengagement, consequently all recovered with a limp which was usually complicated by adduction of the limb and practical shortening. He believed that the attempt should be made to rectify the deformity by gentle traction and abduction, followed by immediate fixation in the manner that he had described. He said the cases presented by Dr. Walker were of particular interest to him because the method had been applied by those who had no previous experience, or special training, in the use of plaster of Paris.

DR. ERDMANN said that a few days ago he was called in consultation to see a case of retention of urine in a patient who had sustained a fracture of the femur about seven years ago. The limb was put up by him in abduction and rotation, the method described a year later by Whitman, and the result was absolutely perfect, in spite of the fact that no special devices, such as the one demonstrated by Dr. Whitman, were made use of.

Dr. Erdmann said he had recently had two cases of fracture of the femur in aged people where it did not seem advisable to

give an anæsthetic. Instead of confining those patients to bed, he had them comfortably fixed in an invalid's chair.

DR. ROBERT H. M. DAWBARN said that one of the speakers apropos of the statement by Dr. Walker that the Bellevue statistics showed a large percentage of their patients dismissed at the end of fifteen days, with fracture of the femoral neck—had criticized this early dismissal as indicative of careless treatment—to use his own words. Dr. Dawbarn thought it fairer and more just to assume, instead, that they had deliberately chosen the second horn of the dilemma presented by these fractures when in old people—the ordinary choice being between attempted bony union with its probably months of immobilization upon the back, with Buck's extension with pulleys and heavy weights—and the terribly frequent result of death from hypostatic pneumonia; or as the second horn, to attempt no union of the fracture, but after recovery from any possible shock, to dismiss the case to permanent lameness and use of crutches.

Dr. Whitman's ingenious plan deserves a fuller trial than in adults it has yet had; and Dr. Walker's results are certainly excellent. In a single point would Dr. Dawbarn venture respectfully to differ from him; namely, his approval, in his paper as printed, of separating, however gently, the fragments in an impacted fracture here—unless the limb should be found rotated so very far outwards or (rarely) inwards as to constitute a really objectionable deformity. Otherwise, and if in later moderately good position of the fragments, an impaction is a blessing.

Dr. Dawbarn thought the present a most appropriate opportunity in which to present briefly the main points of yet another plan of handling, with good reason to hope for bony union and this accomplished both simply and safely. This was the nailing together of the fragments, not by a formidable open operation such as have sometimes been done with success, involving detaching the glutei muscles, dividing the capsule and wiring or spiking the fragments openly. Instead, after from one to three days in bed with Buck's extension, until the normal relationship of the fragments is restored, as ascertained chiefly by comparing the lengths of the base-line of Bryant's triangle, upon both sides, the patient's skin is prepared for operation, which is done in from ten to fifteen minutes depending upon depth of subcutaneous fat. The work is done without removing the patient from the cotbed,

nor displacing the steady tension from the Buck's extension. It is painless, because of cocaine, injecting $\frac{1}{2}$ of one per cent. in the skin, and $\frac{1}{8}$ to $\frac{1}{10}$ of one per cent. beneath, and in the periosteum. The bone interior needs none—thus far in his experience. The incision has its midpoint about 3 inches below the top of the great trochanter. After drilling through the dense bony cortex, a long, slender steel trochar is introduced in a direction between 125 and 130 degrees from the long axis of the shaft; also *forward*, remembering the normal direction in which the femoral head looks, relatively to its trochanter major. It is very easy to recognize the feel of the dense bone of the cortex of the head, as approached by the probe-like trochar. One may deviate at least five degrees from that estimated in any direction, and still if starting his nail at the proper point upon the outer and posterior surface of the shaft (about three inches in a six-foot man, below the trochanter-top) his nail or spike will be within the interior of the bone. The previous examination by a steel probe makes sure of this. In one case the trochar met with positive obstruction before reaching the nearest possible point where a fragment of broken femoral neck could account for this. Upon raising the advancing searcher a little it passed beyond without further trouble. Plainly this was the apex or upper edge of the "Schenkelspoon." The average length of smooth, round, steel nail used is at least three inches. If its point is nearly in contact with the cortex of the head its base will be buried, then, more than an inch within the bone of the shaft, in a femur of ordinary dimensions. The head is filed off, and the base so made is slightly hollowed, to prevent slipping of the "nail-set"—*i.e.*, a similar, but unfired nail, used to drive the first home.

In course of years this nail should either—like other small sterile pieces of iron or steel buried within the body—gradually change to Fe_2O_3 and slowly disappear, or else remain encysted and harmless. In one case he had used an aluminum spike instead of steel—expecting its absorption by the alkaline activities of the blood serum, into aluminum hydrate.

Dr. Dawbarn said his cases have as yet been but few, and only one in private practice. That one, an old lady of over seventy, had originally close to one and a half inches of shortening. She was of course kept in bed as many weeks as if no spike had been used; but without the danger of the hypostatic pneumo-

nia; because, when spiked, and the Buck's extension removed, she did not remain long upon her back, nor in any other one position. She could safely turn in any posture in bed, although doubtless in the early weeks the union would have given way had she attempted to stand. The final result was excellent. Both base lines of Bryant were apparently of the same length. The patient herself, however, was not at all satisfied. She had recently developed a bad case of the scoliosis of the aged, and it advanced speedily in deformity. Her broken thighbone was her right one. The major curve of her scoliosis was as usual toward her right in its convexity; the minor curve below being of course toward the left, and this lifted her right hip strikingly, and of course produced an apparent shortening of the femur not really present. Added to this there was rheumatic pain in the involved hip-joint.

DR. WHITMAN asked Dr. Dawbarn if he recalled the work of the surgeon who had devised the method of spiking the two fragments in fracture of the neck of the femur? He, Nicolayson, drove the nail through the neck and into the acetabulum without an anæsthetic. The results were apparently good. His own objection to the method was that nails do not as a rule serve as persistent supports, but become loose. He preferred therefore to insert a strong drill which could be more easily directed by means of a handle, and when detached could be driven beneath the skin. When it loosened it could be easily removed through a small incision.

DR. DAWBARN, in reply to Dr. Whitman, said he did not recollect the name of the Swedish surgeon who had long advocated spiking, and who does extensive operation, and even has spiked deliberately the femoral head to the acetabulum which the advancing-nail intentionally pierces.

As to the further inquiry of Dr. Whitman whether the permanently remaining nail may not set up a softening and disease of the surrounding bone with time. We used often to see that and indeed occurring in a few weeks time, when as formerly was the rule, spiked the bones together after sawing, in operating, for instance, upon a tuberculous knee. But these bones, while not tubercular to the eye where spiked, are undoubtedly far from normal. Osteoporosis would therefore readily occur, when no such thing would result in bones not of a tubercular diathesis.

To hasten the exudate of callus in these femoral neck fractures in the aged Dr. Dawbarn had used in the case of the old lady referred to an injection all along the track of the nail, within the bone, of the mixture (half pure glycerin, half glycerite of tannin (U. S. P.) boiled together) of which he spoke at another A. M. A. meeting last June; advocating its use in non-union of fracture when due to insufficient callus exudate, and not as most commonly is the case, instead, due to some local trouble, such as lack of good apposition or to soft tissues, torn and interposed.

DR. WALKER, in closing the discussion, said that in one case of fracture of the neck of the femur of eighteen months standing he had resorted to the use of the spiking process referred to by Dr. Dawbarn, and about two months later he found the nail very loose. He thereupon made a small incision, and with the aid of a pair of forceps it was removed without any trouble. In old people—old in years or on account of disease—he did not resort to the use of an anæsthetic.

Stated Meeting, October 23, 1907.

The President, DR. GEORGE WOOLSEY, in the Chair.

EXCISION OF ANTHRAX PUSTULE.

DR. CHARLES L. GIBSON presented a man, 49 years old, a native of Ireland, and a longshoreman by occupation. During the past year he had at various times assisted in unloading large numbers of ox-hides shipped at New Orleans. One month previous to his admission to the House of Relief he had assisted in unloading 1,500 hides, carrying them upon his right shoulder. These hides had been through only the preliminary process of tanning, and the hairs had not been removed.

Two days prior to admission the patient noticed a small papule on the right side of the neck, which was irritated by the collar of his jumper rubbing against it. On the day after the appearance of this papule he became quite weak and felt sick, but he did not complain of pain. He went to bed about 5 P.M., and was awakened about 3 A.M. with the pain and swelling of the neck. He visited the hospital the following morning, but refused treatment. That evening he was again brought to the hospital

in a very weak condition, with marked constitutional symptoms, his temperature on admission being 102° F.; pulse, 104; respirations, 24.

The case was recognized as one of anthrax pustule, and the lesion was immediately excised. The wound was then thoroughly swabbed with pure carbolic acid and eight drams of a five per cent. carbolic acid solution were injected into the adjacent tissues, followed by a wet carbolic acid dressing. This was repeated on the following day. The patient at this time felt well, and his temperature rapidly fell to normal.

A blood culture in this case was sterile. The lesion that had been excised was submitted to a pathologist, who reported as follows: Central part revealed a hemorrhagic, slightly elevated area. The epithelium covering this was maculated, and on section presented a peculiar hemorrhagic and necrotic appearance. About the central area numerous vesicles were seen. Microscopically the lesion gave the usual appearance of anthrax. There were an unusually large number of anthrax bacilli present.

EXCISION OF THE TONGUE UNDER ANAESTHESIA PRODUCED BY SEQUESTRATION ANAEMIA.

DR. ROBERT H. M. DAWBARN presented a man 46 years old, who was referred to Dr. Dawbarn by Dr. Ferdinand S. MacHale, of this city, because of a leucoplakia lingualis of three years' standing. The entire dorsal surface of the tongue was covered with great numbers of small milky patches, while the anterior third of the tongue had undergone superficial ulceration at the site of each such patch, within the previous month, for the first of this phase of his disease. Dr. Jeffries declared this area of ulceration to be typical epithelioma. The patient was operated on at the New York Polyclinic Hospital, the anterior two-thirds of the tongue being removed. Quite a number of the patches of leucoplakia on the dorsal surface of the tongue were left behind rather than remove the entire organ, with consequent extreme risk of death soon from *Schluckpneumonie*; and subsequently disappeared spontaneously, the man having stopped smoking for the first time in many years. (Also, he had formerly carried the habit to great excess.)

In addition to the removal of the tongue, the sublingual and

submaxillary salivary glands, and the greater part of the adjacent tissues as usual, were extirpated and submitted to Dr. Jeffries, who reported that they contained typical cancer lymph-nodes. Enlarged nodes at and below the carotid bifurcation were also found and removed. During the entire operation, which occupied an hour and a half less two minutes, the patient was made to sit bolt upright. The lower extremities were first corded as close to the trunk as possible in order to secure what has been termed, for lack of a better and equally brief name, sequestration anemia; namely, the temporary removal of considerable blood from the head, neck and trunk, and its accumulation in the limbs, usually the lower ones, by cording of proper degree for this purpose. The anæsthesia (ether) was withdrawn as soon as the cording process was completed, and the operation commenced. The patient was able to endure the long operation (really three of them, as stated), without any further anæsthetic at all; sleeping quietly through the work in this so sensitive region. One hour before beginning the operation he had received two ounces of whiskey, diluted, and a hypodermic of one-quarter grain of morphine combined with one-one hundred and fiftieth of a grain of atropine. This is Dr. Dawbarn's routine before any form of anæsthesia, whether general or local. It will be admitted, the doctor thought, that this preliminary treatment, given chiefly to prevent fear and induce cheerfulness, to avoid risk of psychic shock, would not go far to explain, *per se*, the satisfactory anæsthesia. Upon the completion of the excision of the anterior two-thirds of the tongue, Dr. Dawbarn made a small slit into the intrinsic muscle of the remnant of the tongue, and into this he inserted the distal end of the twelfth nerve, fastening it there with a very fine chromic stitch or two through its sheath, with the idea of aiding a quicker return control of the epiglottis during the act of swallowing by this contact of the motor nerve with the muscles. This step he has long employed; and cases describing it were published in his Gross prize essay. About ten days after the operation, the patient, through some misunderstanding of positive orders, was allowed to sit up for only a couple of hours. In consequence, just as was feared, he promptly developed symptoms of *Schluckpneumonie*, entirely central, as it proved, and thus painless, but with initial chill, very high fever, and some bloody expectoration after coughing. His life was seriously jeopardized,

but he came through, making, however, of course, a slower convalescence. The speaker said he had become convinced that after excision of the tongue the patient should be kept with the head low enough to avoid permitting the rankly dangerous pus and saliva gravitating into the air passages—since the epiglottis could no longer protect the larynx, for a period of time varying, of course, with the age and vitality, and the proportion of tongue left. The mouth should also be kept as cleanly as possible by hourly use, by the patient himself, of a fountain syringe for irrigation. The head should not be allowed raised at all until the mouth is at length free from all sloughs and from offensive odors. At this time the ice-water test should be used; namely, immediately after thorough cleansing of the mouth, the patient, permitted up for the moment, attempts to swallow a little ice water. If this can at last be done without inducing coughing, he is safe. Otherwise he should again lie with head low, no matter if weeks longer, until the stump has finally learned to control the epiglottis. Dr. Dawbarn said he has repeatedly published cases, two of them in his book mentioned, giving absolute proof of the danger of pneumonia, and consequent death, from following the usual teaching—that is, allowing patients up almost at once—"the sooner the better"—after such an operation. It cannot be discouraged in too strong terms.

In conclusion, Dr. Dawbarn said he did not at all wish to assert that satisfactory anesthesia without continuance of ether will always—perhaps not even very often—result from the anemia—like that of normal sleep, apparently—caused by the sequestration method used in this case.

LEUCOPLAKIA LINGUALIS.

DR. DAWBARN also presented a man, 63 years old, who had been operated on by Dr. Edward Milton Foote on March 19, 1907, in the City Hospital, for a leucoplakia lingualis of some years' standing, with a cancerous nodule on the left side of the tongue. About one-half to two-thirds of the tongue was removed, together with the submaxillary glands and the adjacent lymphatics. In this case no cancerous nodules were found within the glands. Dr. Foote's case was accompanied by several excellent drawings from the microscopical slides, showing the epithelial cancer.

HODGKIN'S DISEASE TREATED WITH THE MIXED TOXINS OF ERYSIPELAS AND BACILLUS PRODIGIOSUS.

DR. WILLIAM B. COLEY presented a man, 25 years of age, who was admitted to the General Memorial Hospital on October 10th, with the following history:

About a year ago he noticed a tumor in the right side of the neck behind the sterno-mastoid muscle, which was apparently an enlarged gland. It was smooth in outline and freely movable. Shortly afterward a similar tumor occurred in the neighboring gland. A few months ago like enlargements were noticed in both axillæ and in the groin. On the day he was admitted to the General Memorial Hospital, October 10th, he was examined by Dr. Wm. K. Draper, attending physician to the hospital, who pronounced the case undoubtedly one of Hodgkin's disease. The patient had had no treatment prior to his admission.

Physical examination on October 10, 1907, showed the whole right side of the neck, from the mastoid to the clavicle, occupied by a large number of tumors apparently starting in the lymphatic glands, both anteriorly and posteriorly to the sterno-mastoid muscle. The tumors varied from the size of a Lima bean to that of an English walnut. The skin was not adherent and the tumors were fairly movable upon each other and upon the deeper structures. There was only slight involvement of the glands of the left side of the neck. Both axillary regions were occupied by similar tumors. The glands in both groins were also markedly enlarged. Examination of the abdomen showed the spleen enlarged and easily palpable, extending about one inch beyond the costal arch.

Examination of the blood showed the following: Leucocytes, 4,050; red blood cells, 4,070,000; polynuclear, 62 per cent.; large lymphocytes, 18 per cent.; small leucocytes, 17 per cent.; transitionals, 3 per cent.

Being strongly of the opinion that Hodgkin's disease is really a type of sarcoma of the lymphatic glands, rather than a separate disease, Dr. Coley immediately placed the patient upon small doses of the mixed toxins of erysipelas and bacillus prodigiosus, the initial dose being $\frac{1}{4}$ mm. injected into the pectoral region. The patient proved very susceptible to the toxins and the highest temperature at the end of one week's treatment, 105.6° , followed a dose of only $1\frac{1}{2}$ mm. injected into the pectoral region. He

was given five to six treatments a week, none of the injections being made into the tumor. At the end of the first week he was found to have lost 5 pounds in weight, which he regained the second week.

At the time of presentation, thirteen days after the beginning of the treatment, the tumors in the neck had decreased fully two-thirds in size, the axillary and inguinal tumors had entirely disappeared and the spleen had diminished to such an extent that it could barely be felt on careful palpation. Absolutely no other treatment of any kind was given the patient during this period. The second examination of the blood at the end of the second week showed the white cells to have increased from 4,000 to 12,000. The red cells remained the same; the polynuclear cells had increased to 82 per cent.

NOTE.—Although no microscopical examination had been made at the time the case was reported, one of the tumors of the neck was removed shortly afterward and microscopical examination made by Dr. James Ewing, professor of pathology of Cornell Medical School, showed it to be a typical Hodgkin's disease.

EPITHELIOMA OF PALATE AND FAUCES.

DR. WILLIAM A. DOWNES presented a man, 42 years old, who was admitted to the General Memorial Hospital on August 25, 1907, with the history of having had a growth in the roof of the mouth for two years. In the beginning it was situated about the middle of the hard palate. Ten months ago an operation was undertaken to remove the mass, but on account of its extent the effort was abandoned. He was treated with the X-ray from that time until his admission to the hospital.

Upon examination, the entire hard and soft palate was found to be the seat of a fungating growth which projected into the mouth from one-half to three-quarters of an inch. The right anterior pillar was involved to a limited extent. In the centre of the hard palate was an opening, which would admit the end of the thumb; this connected with the nasal fossæ, and was the result of the previous operation. There was a very foul odor, due to the necrosed bone. A few moderately enlarged glands could be made out in the submaxillary region on each side. A specimen removed before the patient was sent to the hospital showed the growth to be typical epithelioma, and although the

involvement was very extensive, an operation was advised on account of the age of the patient and his very excellent condition.

Operation, August 26, 1907. Ether was administered by means of tubes passed through the nose well down into the pharynx, and the pharyngeal cavity was packed with gauze. Through a curved incision the right external carotid was tied, and a few small glands in the submaxillary region removed. Through a similar incision made on the left side a few slightly enlarged glands were extirpated and a loop of catgut was passed around the left external carotid. This loop was drawn upon gently by an assistant, and held in such a manner as to control the flow of blood through the artery. A median incision was then made through the upper lip and carried around either wing of the nose. Each half of the lip was retracted, and the nose freed from the anterior nasal process. After extracting the incisor teeth, the greater portion of the hard palate was removed with bone forceps—one blade in the nasal fossa and the other in the mouth. The soft palate and right anterior pillar were then removed with scissors. The vomer was cut away for some distance, as the disease had extended considerably in that direction. The growth had also invaded the alveolar processes, excepting the portion adjacent to the second and third molars on the left side, so it was necessary to remove the entire alveolar process on the right side and the greater part of the left. This was done with the bone scissors, going up on the outer wall of each antrum.

The bleeding had been controlled perfectly by the temporary ligature around the carotid. It became profuse, however, as soon as traction on the loop was discontinued, and all efforts at packing the cavity were futile. As only the outer wall of each antrum remained, it was impossible to get the packing to remain in place, nor could it be carried into the anterior part of the cavity, as by doing so the nostrils became occluded. After some delay it was deemed best to tie the left external carotid, and this was done with the same loop of catgut that had been used to make traction on the vessel. This immediately controlled the hemorrhage. The speaker said he had some misgivings as to how the incision through the lip would heal after the ligation of both external carotids, but barring a slight blanching for twenty-four hours the wound healed as was customary for wounds in this location. Healing in the lip as well as the neck was by first inten-

tion. The patient soon learned to swallow liquids by holding the head well back, and was discharged at the end of the second week. Two weeks ago a small recurrence was noted on the portion of the alveolar process which had been left. This had appeared suspicious at the time of operation, but it was left behind in the hope that it would be of use when the time came to fit an appliance to take the place, in a measure, of the missing palate and teeth. Under ether, the remaining molar teeth and this portion of the alveolar process were removed. The patient now felt better than he had in the past eighteen months and had gained considerable weight, although limited to fluid and soft diet. While his speech was naturally much interfered with, he could easily make himself understood.

SIMPLE FRACTURE OF THE CARPAL SCAPHOID.

DR. WILLIAM A. DOWNES read a paper with the above title for which see page. 72. In connection with his paper, Dr. Downes showed a number of patients and radiographs illustrating fracture of the carpal scaphoid.

DR. JOSEPH A. BLAKE asked Dr. Downes what his experience had been in cases of fracture of this kind with dislocation of the semilunar bone and considerable displacement of the fragments. Whether, under such conditions, it would be better to remove the entire row of bones, or only the semilunar and fragments? Some years ago, Dr. Blake said, he showed a case of fracture of the carpal scaphoid, with dislocation of the fragments, in which an operation had been advised but refused. The result of non-interference was a comparatively stiff wrist, with very little return of power. For at least a year following the accident there was considerable pain on using the wrist, and limitation of motion still persisted.

DR. CHARLES H. PECK said he recently saw a patient who about six years ago had fallen from his horse, striking on the extended hand. The case was treated as a sprain, and since the time of the accident the patient had never been entirely free from pain over the carpal scaphoid, and this had interfered with his duties, which were those of a mining engineer. Nothing abnormal could be felt in the wrist, but a radiograph seemed to confirm the diagnosis of old fracture of the carpal scaphoid.

DR. ARTHUR LYMAN FISK said that in the early part of the

summer he saw a case of fracture of the radius in which the fragments were badly united, and on attempting to break the union, there was a sudden snap, which, he believes, must have been due to fracture of the scaphoid. In this instance the accident was produced by hyperextension, while endeavoring to separate the lower fragment of the radius from the upper.

DR. JOHN A. HARTWELL said that a small branch of the radial nerve passed over the radius in the so-called anatomical snuffbox of the wrist, and that pressure upon this point gave rise to considerable pain, even under normal conditions. This fact had recently led him to suspect a fracture of the carpal scaphoid in a case which proved to be a simple sprain. The X-ray showed that no fracture had occurred.

DR. GEORGE A. WOOLSEY said that Dr. Downes' paper was important in calling attention to an injury which was now recognized much more frequently than before the introduction of the X-ray. Personally, he could recall but a single case when the diagnosis was made, and in that instance there was a compound fracture of the scaphoid with dislocation of the semilunar.

DR. DOWNES, in closing the discussion, said that his experience was limited to cases of simple fracture. He had seen no case in which there was either a dislocation or injury of the semilunar. In one case of that character under the care of Dr. L. A. Stimson, an operation had been done for the removal of one or both fragments of the fractured scaphoid. That case had been reported by Dr. Stimson at a meeting of the Society last spring. The injury had occurred in a man who fell thirty feet, fracturing his pelvis, and receiving an anterior dislocation of the semilunar with fracture of the scaphoid, and Dr. Stimson removed the proximal portion of the scaphoid and semilunar bones. The wrist subsequently could not be extended beyond a straight line; flexion was limited to about one-half, and there was considerable radial shortening of the carpus; however, some improvement in motion is taking place and the patient has a fairly useful hand.

Dr. Downes said the point of tenderness in the normal wrist to which Dr. Hartwell had referred had been mentioned by Codman and Chase, and also by Eisendrath. In cases of fracture the tenderness was not absolutely limited to the snuffbox, but often extended fairly well over towards the inner side of the radius. While the X-ray was the most important aid in the recog-

dition of this form of fracture, the possible presence of crepitus should not be overlooked.

ACUTE DIVERTICULITIS OF DESCENDING COLON
AND SIGMOID PERFORATION.

DR. CLARENCE A. McWILLIAMS reported the history of a man, 47 years old, who was brought to the Presbyterian Hospital by ambulance on October 4, 1907, at 8 P.M. His sickness began four days previously, and prior to that he had been constipated for a week. His previous history was negative. Four days prior to his admission he had a chill in the morning and some cramps in the abdomen, which were not localized. During the two following days he was up and about and did not have any medical attention. About 4 A.M. of the morning of admission he was seized with an excruciating pain in the abdomen, requiring the administration of morphine, which relieved him. In the afternoon he vomited for the first time. He could not localize his pain but thought it was more severe on the right side. His temperature on admission was 104.4; pulse, 155, and of poor quality. The abdomen was much distended and rigid in all directions. The patient was a very corpulent man, and no mass could be felt. The abdomen was tender everywhere, but especially so in the suprapubic region and in the right iliac fossa. There was flatness in the right flank, which extended downward anteriorly. There was an indistinct fluid wave in the abdomen. Rectal examination was negative. The leucocytosis was 14,000.

The diagnosis was made of general septic peritonitis due to appendicitis. On opening the abdomen over the appendix by an intermuscular incision, milky fluid under great tension spurted out for a distance of two feet. The intestines were flaked with large masses of fibrin; they were dull and rough, and adherent in places. The pelvis was full of milky fluid, which also gushed from the liver region. The appendix was brought into the wound and was found to be no more inflamed than the remainder of the intestines. The appendix was removed and a small incision was then made through the middle of the upper part of the right rectus, allowing the escape of a large amount of fluid which was clearer than that in the pelvis. A large quantity of fluid was also found between the liver and diaphragm. The stomach was enormously dilated with fluid; its surface was normal, showing

that there was no perforated ulcer present. The pancreas and gall-bladder were normal. At this time the man's condition was such that further exploratory procedures were deemed inadvisable, and the wounds were hastily closed, with drainage. Death occurred shortly after the operation.

Autopsy.—On opening the abdomen, the omentum was found adherent to the coils of intestine. There was a thick coating of pus over the latter, glueing them together, and forming many pockets of pus. The purulent exudate extended over the entire peritoneum from the pelvis to the dome of the liver and the splenic region. The peritoneum was not much injected excepting in a few areas, the largest and most intense of which was just below the greater curvature of the stomach and to the left of the median line. There was also a considerable collection of pus in this area. The exudate had no distinct fecal odor.

The intestinal canal was apparently normal until the cecum was reached. The stump of the appendix was found to be in good condition. In the upper part of the ascending colon the saccules became of large size, and this condition increased in extent throughout the transverse and descending colon. The depth was considerable and in some cases seemed to penetrate to just below the serosa. On the peritoneal surface of the descending colon, about 10 cm. below the splenic flexure, there was a thick layer of lymph 5 cm. in diameter in the centre of which a funnel-shaped depression was seen. This communicated with a round, punched-out area about the size of a lead pencil, in the interstitial wall situated at the apex of one of the sacculi. The number of saccules diminished in the rectum, which was fairly smooth. No concretions were found in the diverticula. Cultures from the peritoneum, spleen, liver and heart-blood showed pure growths of the bacillus coli.

The perforation in this case, Dr. McWilliams said, was not discovered in the autopsy until the intestines had been removed from the body and had been split open. It could readily be seen how impossible it would be to detect such an opening on the operating table, buried as it was by fat and intestinal folds. From the adhesions in the abdomen it was fair to assume that the peritonitis had been in existence for three or four days, the perforation probably dating from the initial chill and abdominal pain. His previous history threw no light on the etiology of

the diverticulitis save a constipation of one week's duration, for the relief of which he had taken Rochelle salts.

DR. BLAKE said that about eight years ago he had operated on a case of diverticulitis of the large intestine, with perforation and diffuse peritonitis, which was not general. By sewing up the intestine and introducing free drainage, the patient recovered with a fistula. An attempt was subsequently made to close the fistula, but this proved unsuccessful, and when Dr. Blake last saw the patient the fistula still persisted probably on account of epithelization of the tract.

TRANSACTIONS

OF THE

PHILADELPHIA ACADEMY OF SURGERY.

Stated Meeting held October 1, 1907.

TENDON TRANSPLANTATION FOR CONGENITAL CLUB FOOT.

DR. RICHARD H. HARTE presented a boy, born in February, 1901, with double congenital equino-varus. He came under the care of Dr. G. G. Davis at the Orthopædic Hospital, when 3 months of age. Dr. Davis did tenotomy of the tendo-Achillis of both feet, and partially corrected the deformity. The child was then sent to his home in Hazleton, Pa., and next applied to the Orthopædic Hospital in December, 1903, when he was under the care of Dr. Barton Hopkins, who found such a recurrence of the deformity that he did a cuneiform tarsectomy on both feet. He resorted to this operation only after failing to maintain a good position by the use of forcible manipulations and the use of plaster casts. The patient was sent home two months later, February, 1904, wearing braces. He was readmitted, coming under Dr. Harte's care March 17, 1905, with recurrence of the varus deformity in both feet. Without his braces he could not walk at all. On April 6, 1905, Dr. Harte did astragalectomy on the left foot, combined with tenotomy of the plantar fascia and the tendo-Achillis. On May 18, 1905, the same operations were repeated on the right foot. By these second bone operations it was hoped that a recurrence of the deformity would be prevented, as the foot came into very good position. The patient was again sent home wearing braces. Six months later, January 11, 1906, he was again admitted to Dr. Harte's service at the Orthopædic Hospital, with recurrence of the varus deformity. Both feet were forcibly stretched, the patient being etherized, on January 12, 1906. The plaster casts were finally removed March 15, 1906, and the feet treated by

massage and overcorrection (without ether) daily for two months. New braces were applied in May, 1906, and the boy was again sent back to his home June 19, 1906, with his feet in very good position. Six months later, in January, 1907, he was again readmitted, the varus deformity having recurred to the extent shown in Fig. 1. On January 16, 1907, Dr. Harte did open tenotomy of all structures in the contracted soles of both feet, dividing tendons and fascia down to the bones. These wounds were left unsutured, and plaster casts applied. On February 18, 1907, both feet were stretched (ether) manually, and again put up in plaster. On March 9, and again on April 13, 1907, both feet were forcibly overcorrected by means of Hopkin's osteoclast, and Davis's tarsoclast. The feet now could easily be maintained in the overcorrected position by the pressure of one finger. On May 23, 1907, tendon transplantation was done, the tibialis anticus being separated from its attachment in each foot, and sutured to the tendon of the peroneus brevis at its insertion into the tuberosity of the fifth metatarsal bone. On July 10, seven weeks after this operation, the casts were removed, but as a matter of precaution new casts were applied for several weeks longer.

The boy now wears shoes with the sole extended and raised on the outer side, to throw the foot into a position of overcorrection (slight valgus), and with stout instep straps, to keep the heel of the foot well down in the shoe. The transplanted tendons by their action effectually prevent any tendency to the reproduction of the varus deformity, and it is hoped that at last the patient is permanently relieved of his deformity, as well as of the necessity for wearing ponderous and cumbersome braces. Figs. 2 and 3 show the present appearance of the feet, as well as the style of shoes worn.

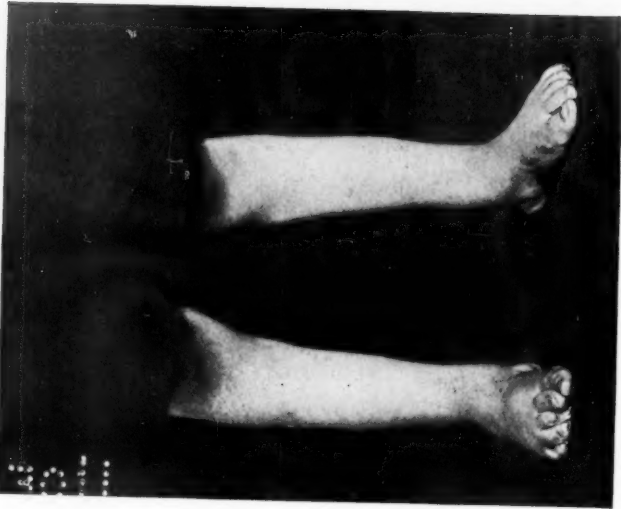
DR. GWYLYM G. DAVIS said that the main interest in this class of cases to him was the question of the transplantation of tendons for congenital club-foot. The transplantation of tendons for paralytic deformities is well known, but for congenital deformities it is not so much practiced. The cause of congenital deformity is unknown; the cause of paralytic deformity is of course the paralysis, and if this paralysis is not recovered from it produces an obstinate laming which is permanent. Therefore, if one transplants an active tendon to the opposite side and judges correctly the relative amount of strength of the two sides, then

FIG. 1.



Before tendon transplantation; congenital equino-varus, second relapse after cuineform tarsectomy and astragalectomy.

FIG. 2.



After tendon transplantation; tibialis anticus transplanted to insertion of peroneus brevis.

FIG. 3.



Shoes with soles extended and raised on outer side; also instep strap.

there results a balanced foot. But in a congenital case an entirely different thing is to be dealt with. There is contraction of tendons on one side and a lengthening of tendons on the other side, but the muscles of the lengthened tendons do not give the reaction of degeneration. They are not paralyzed tendons; therefore, if one can succeed in straightening the foot and keeping it straight with massage, electricity and exercise, then one gradually gets a restoration of function, and, theoretically, one should have the foot well balanced, and have an apparently normal foot as a result.

In his experience every now and then a case comes up, such as this boy, in which, even though the foot be kept in good position, the lengthened muscles do not contract and regain the tonicity and strength and power of the muscles on the contracted side. Therefore, in certain cases, even of congenital club-foot, surgeons are fully justified in transplanting the tibialis anticus muscle from the inner towards the outer side of the foot, and then allowing the child to get around. If, as the child grows older, it is found the transplanted anterior tibial and the peroneal muscles produce a preponderance of power on that side, one can put the anterior tibial back again. Therefore as a sort of temporary expedient he believed in a certain few selected cases in the transplantation of tendons even for congenital deformities.

LUXATION OF SPINAL VERTEBRAE.—GUNSHOT WOUND OF BRAIN.

DR. JOSEPH M. SPELLISSY reported four cases of vertebral luxation; and one of gunshot wound of the brain, as follows:

CASE I.—(G. B.) *Luxation of Last Thoracic Vertebra, Kyphotic Deformity, Slight Paralysis; Recovery with Apparatus in Seven Weeks.*

The injury was received March 10, 1907, while working beneath a roof, the supports of which gave way, thus permitting the weight of the structure to come suddenly upon the patient's head and back. He was removed to the Methodist Hospital, where examination discovered posterior deformity, extreme tenderness, and complaint of pain at the junction of the thoracic and lumbar vertebræ. Pain was also referred to the abdomen and posterior regions of both thighs. X-ray examination showed separation of the posterior margins of the vertebræ involved.

Examination by Dr. James Hendrie Lloyd found slight paralysis of the lower limbs and diminished knee jerks. These conditions were still present two weeks after the injury.

The condition was treated as a case of spinal caries, with extension and counter-extension in the supine position, and with a pad beneath the kyphos for six weeks, at the end of which the patient became ambulant with a Taylor spine brace, and was discharged from the hospital at the end of the seventh week with complete recovery of the use of his lower limbs. Three and a half months after the injury he had discarded his brace and resumed his occupation. Slight posterior deformity remains, as shown in the accompanying photograph. (Fig. 1.)

CASE II.—(H. M.) *Rupture of the Common Spinal Ligament, Luxation of the Third Dorsal Vertebra, Laminectomy on the Fifth Day After the Injury, Delirium Tremens on the Sixth Day, Death on the Nineteenth Day.*

The injury resulted from a fall of thirty feet from a scaffold, on October 14, 1906. The victim did not lose consciousness, but suffered immediate paralysis of his lower limbs, was unable to flex his fingers, and experienced through his arms and upper back pain likened to the passage of a red hot iron. He was removed to St. Joseph's Hospital.

The pupils were normal, there was retention of urine and loss of knee and plantar reflexes. There was total anesthesia up to the level of the second rib, and there was slight evidence of posterior deformity in the upper thoracic vertebræ.

Surgical intervention was delayed until the fifth day after injury, at the suggestion of Dr. Charles K. Mills, who saw the case in consultation.

The posterior common spinal ligament was found ruptured at what appeared to be the joint of the third and fourth dorsal vertebræ, suggesting that the cord lesion had resulted from forced spinal flexion and anterior luxation of the third dorsal vertebra. (Fig. 2.). The lamina of the third and fourth dorsal vertebræ were removed, and the wound closed with drainage.

Following the operation, sensation descended to the level of the third sterno-costal junction. Delirium tremens appeared upon the following day, and was followed by rectal incontinence, trophic sores, and on the nineteenth day by death.

For the thorough and interesting study and for the excellent

CASE I.

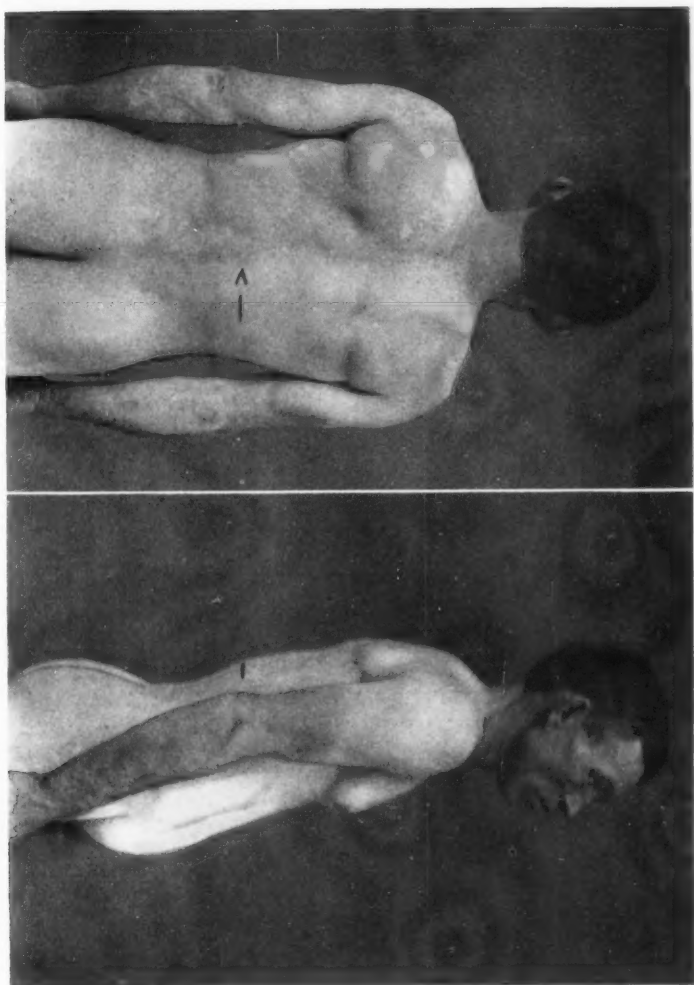


Fig. 1.—Luxation of last thoracic vertebra.

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CASE II.

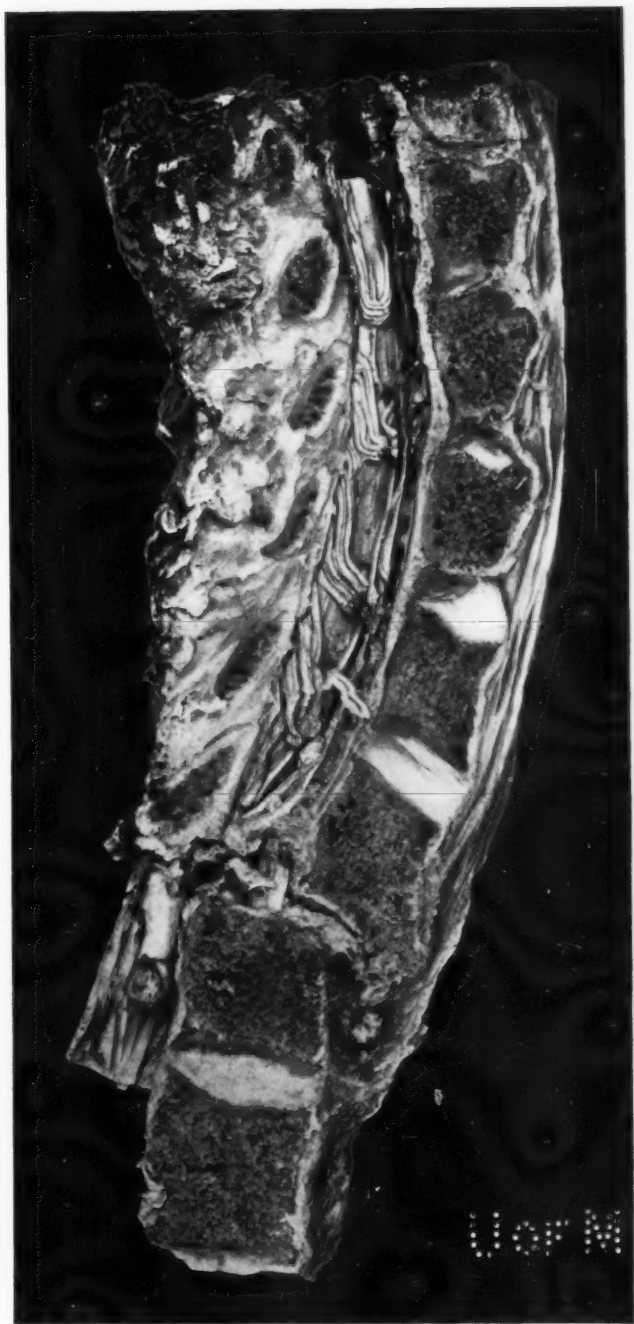


FIG. 2.—Anterior luxation of upper thoracic vertebra. (Photograph by A. R. Allen, M.D.)

CASE IV-A.



FIG. 2.—Luxation of second cervical vertebra. (Radiograph by F. O. Allen, M.D.)

photographs of the spinal cord in this case, he was indebted to Dr. Alfred Reginald Allen.

CASE III.—(J. L.) *Dislocation of the Sixth Cervical Vertebra; Death in Twenty Hours.*

While driving a wagon rapidly under a doorway, on November 1, 1906, the patient's forehead struck a beam and he was bent backward and immediately paralyzed, being unable to move his limbs or his left arm. He had to be lifted from his driver's seat. He was taken to St. Joseph's Hospital.

Examination showed complete motor paralysis of the lower limbs and inability to draw either hand to the head. There was total anesthesia below the junction of the second rib with the sternum, and in both arms posteriorly.

Consultation with Dr. Charles K. Mills deferred surgical intervention. Sixteen hours after admission the temperature had risen continuously from 94° F. to 103°. Twenty and one-half hours after admission it had declined to 101°, the respiratory rate having advanced from 16 on admission to 36, when death took place suddenly.

The character of the injury was established by autopsy, but careful study of the interesting specimen was prevented by its loss. Its gross examination showed rupture of the posterior common ligament, stripping of the anterior ligament from the vertebral bodies, posterior luxation of the sixth and upper cervical vertebrae en masse, with resultant laceration of the cervical spinal cord, which was nearly completely severed, and the presence of free hemorrhage as evidenced by a clot between the surfaces of the partially divided cord, and down the side of the cord to the level of the fifth thoracic vertebra.

CASE IV.—(J. D.) *Luxation of the Second Cervical Vertebra. Patient Ambulant from Time of Injury. Mechanical Cure of Traumatism, Followed by Surgical Neurosis.*

A crane for lifting beeves broke and fell on the patient's head in May, 1906. Two days later, examination in the out-patient service of the Pennsylvania Hospital discovered luxation of the second cervical vertebra. X-ray examination corroborated the clinical opinion. (Fig. 3.) The patient, who was unwilling to remain recumbent, was treated with a fixed dressing of plaster, until the completion of the brace exhibited. (Figs. 6, 7, and 8.).

While the surgical condition is now cured, and the brace

could be dispensed with, the patient for several months has exhibited various hysterical symptoms, including convulsions, and is now attending the nervous dispensary of the University Hospital.

GUNSHOT WOUND OF BRAIN.

CASE V.—(A. G.) *Location of Bullet in Brain by X-ray Verified at Operation. Death on the Ninth Day. Autopsy Discovers Bullet One-Eighth Inch from Operative Counter-Opening.*

The injury was self-inflicted, terminating a debauch. The wound of entrance was at the angle of the right eye. The patient was unable to speak, though there was a little evidence of his understanding some of what was said to him. The right arm was paralyzed, and there was deviation of the tongue.

The X-ray plates printed in the illustrations were made on the admission of the patient to St. Joseph's Hospital within a couple of hours after the shooting. They confirmed the indications of injury to the left side of the brain, and located the bullet in a plane $1\frac{5}{8}$ inches internal to the left side of the skull (Fig. 4), and $3\frac{1}{8}$ inches below the vertex of the skull, and $5\frac{1}{4}$ inches posterior to the frontal eminence. (Fig. 5). The patient being prepared for operation, a trephine button was removed from the left side of the skull in accordance with these measurements, and a probe passed inward encountered the bullet on three different occasions. Attempted extraction by forceps proving futile, a little finger was inserted, but failed to recognize the bullet's presence. The patient was then turned over so that the operative wound was below, and an attempt was made to shake the bullet out. This was also ineffectual. The patient lived for nine days, being restless, but on no occasion having a convulsion; the temperature keeping between 97° and 99° , with the exception of one day, on which it mounted to 101° . The pulse was generally rapid and the respiratory rate was but slightly increased. The path of the bullet nearly traversed the brain. The operative wound for its removal completed the pathway, making an obtuse angle at the location of the bullet. Had the patient's head been turned with the counter-opening wound downward as soon as the latter was made, the prospects of the bullet's removal would have been increased. As it was, the bullet was sustained in the jelly-like consistency of the brain, and was easily dislocated and lost by the instrumental attempts at its removal.

CASE V.



FIG. 4.—Bullet $1\frac{5}{8}$ " internal to left margin of skull. (Radiograph by J. E. Roberts, M.D.)

CASE V.

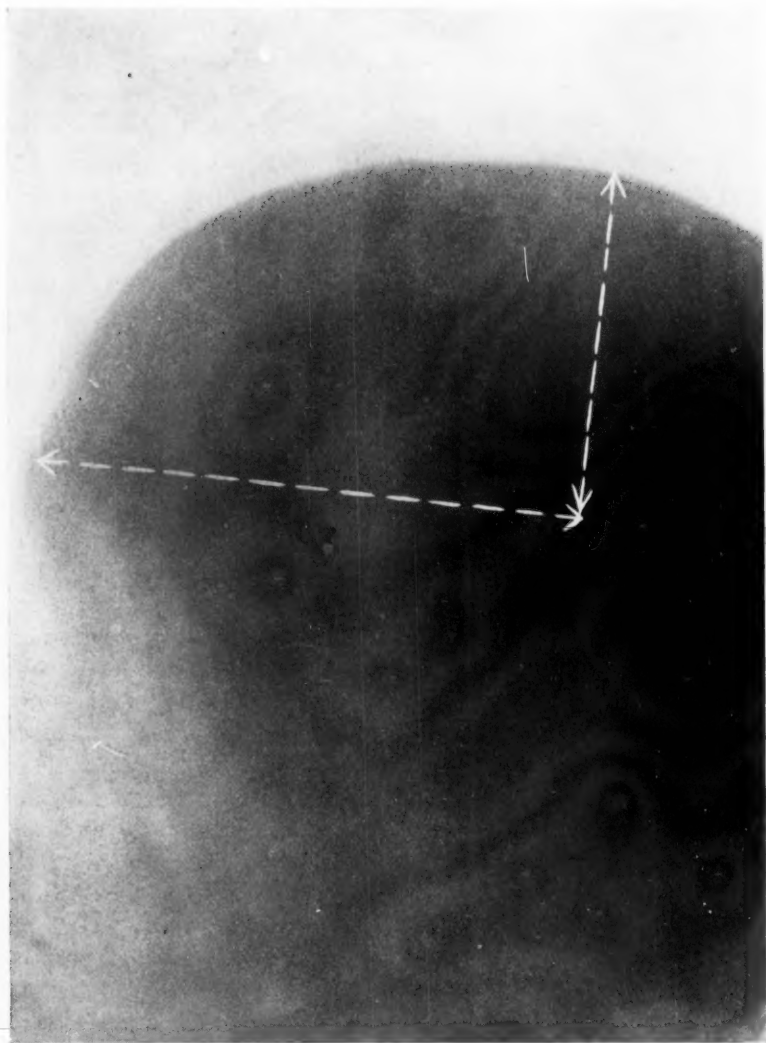


FIG. 5.—Bullet. $\left\{ \begin{array}{l} 5\frac{1}{4}'' \text{ posterior to frontal eminence.} \\ 3\frac{1}{8}'' \text{ below the vertex.} \end{array} \right.$ Radiograph by J. E. Roberts, M.D.

At the suggestion of Dr. Addinell Hewson, the post-mortem examination of the pathway of the bullet was made by vertical transverse sections of the brain from before backwards.

The bullet after passing through the skull just outside the external angle of the orbit, immediately above the zygoma, entered the brain on the basal surface of the right frontal lobe, just in front of the temporo-sphenoidal lobe, two inches anterior to the central fissure, and one and one-quarter inches from the mesial surface of the right hemisphere, passing upward, backward, and to the left through the right lenticular nucleus, the anterior segment of the internal capsule, the caudate nucleus, the lateral ventricle of the right side, the septum lucidum, and the corpus callosum on the left side and then in to the left lateral ventricle, lodging at a site the plane of which was two inches posterior to the plane of the point of entrance. The position of the exploratory counter-opening, through which the bullet was touched at operation, was one inch posterior to the central fissure, and one inch above the plane of the fissure of Sylvius, in the lower post central convolution.

At autopsy, the bullet was removed from the site to which it had been dislodged in attempts at extraction. It was one-half inch posterior to the central fissure and one-half inch above the fissure of Sylvius; that is, one-half inch above the trephine opening, one-quarter inch posterior to it and one-quarter inch internal to the dura-mater. The original site of the bullet having been one and five-eighths inches internal to the skull.

Dr. Spellissy remarked that in the four cases of spinal luxation the injury resulted from great weight or force being suddenly applied to the head. The character of the injury was verified in the first and fourth cases by X-ray examination, and in the second and third by autopsy, the sites of injury being: in Case I, the lumbar-thoracic junction; in Case II, the third and fourth thoracic junction; in Case III, the sixth and seventh cervical junction; and in Case IV, the second and third cervical. In Cases II and III, there was gross injury to the cord, and death followed. Case II operated upon on the fifth day, became complicated by delirium-tremens and terminated on the nineteenth day, in no way improved by the operation.

Might immediate intervention have accomplished any more either for Case II or III? In Cases I and IV there was complete

recovery. In Case I there were symptoms of cord injury, which disappeared with fixation and extension. In Case IV, there was only pain and muscular rigidity. He had successfully used the appliance employed in it in a case of cervical caries.

The apparatus (Figs. 6, 7 and 8) consists essentially of a pelvic band, united in front by a webbing strap. From the back of the band two uprights, equally distant from the median line, follow the contour of the back, neck and head to the level of the parietal eminences, where they turn at right angles and embrace the head, terminating on a line with the external angle of the eye. An occipito-mental headpiece is buckled with webbing straps fore and aft, on each side, to the horizontal arms of the uprights and affords effective extension of head and spine, when sufficient traction is made. A webbing band passing round the brow and buckling to the uprights of this bifurcated jury-mast just below their horizontal turn, fixes the head and prevents lateral movement. The use of webbing straps permits easier gradation of the degree of extension employed.

There is no doubt that some cases of cord injury can be benefited by immediate operation and that in others it is at least an unnecessary hardship if not an absolute injury. But whether as a routine practice in severe cases it is the most conservative measure to at once make an inspection of brain and cord is a question that is worthy of study by trial.

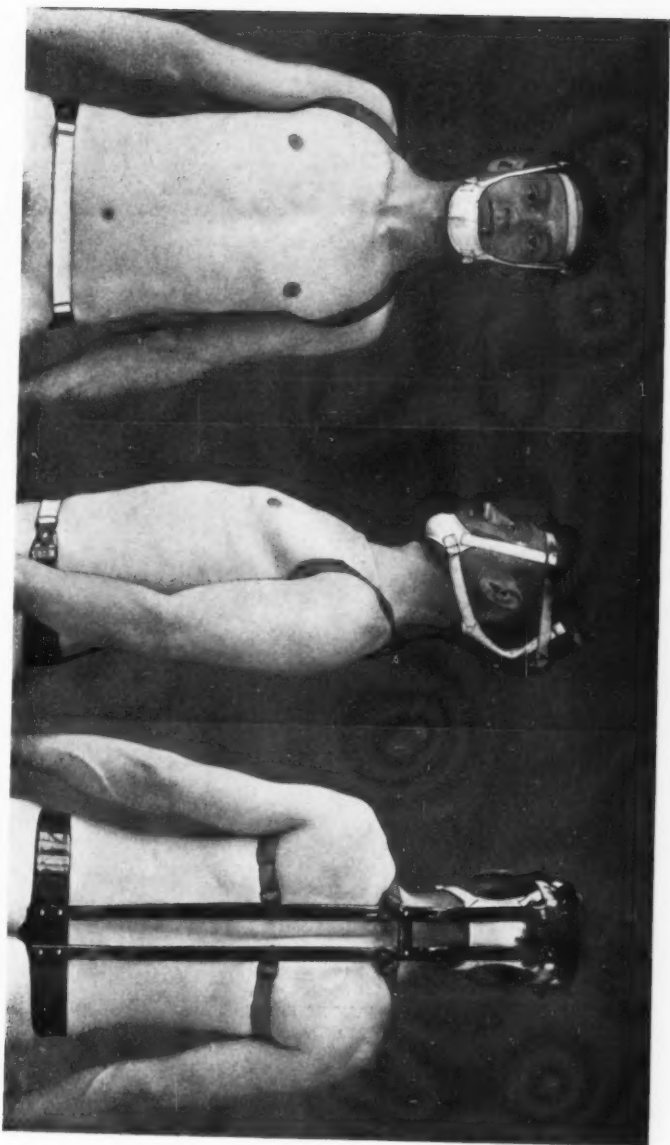
The report of the gunshot wound of the brain instances the accuracy of X-ray localization in these cases, a nine days survival of through and through brain injury, and the advisability of turning the counter-opening downward when probing and attempting extraction of bullets from the brain.

DR. ALFRED R. ALLEN said that he had studied microscopically the case (Harry M.) of spinal fracture dislocation.

The line of fracture was from above and posteriorly downward and anteriorly, the luxated vertebra tearing away the anterior superior lip of the body of the vertebra next below. The pathological material which he received was a part of the vertebral column, comprising six vertebræ above the fracture-dislocation and two vertebræ below.

A section of the spinal cord at the highest level of that particular specimen indicated from the relationship of gray and white matter that it was a thoracic segment. Now if it be

CASE IV.



Figs. 6, 7, 8. Front, side and back of cervical spine extension, steel and hard rubber brace.

CASE II.

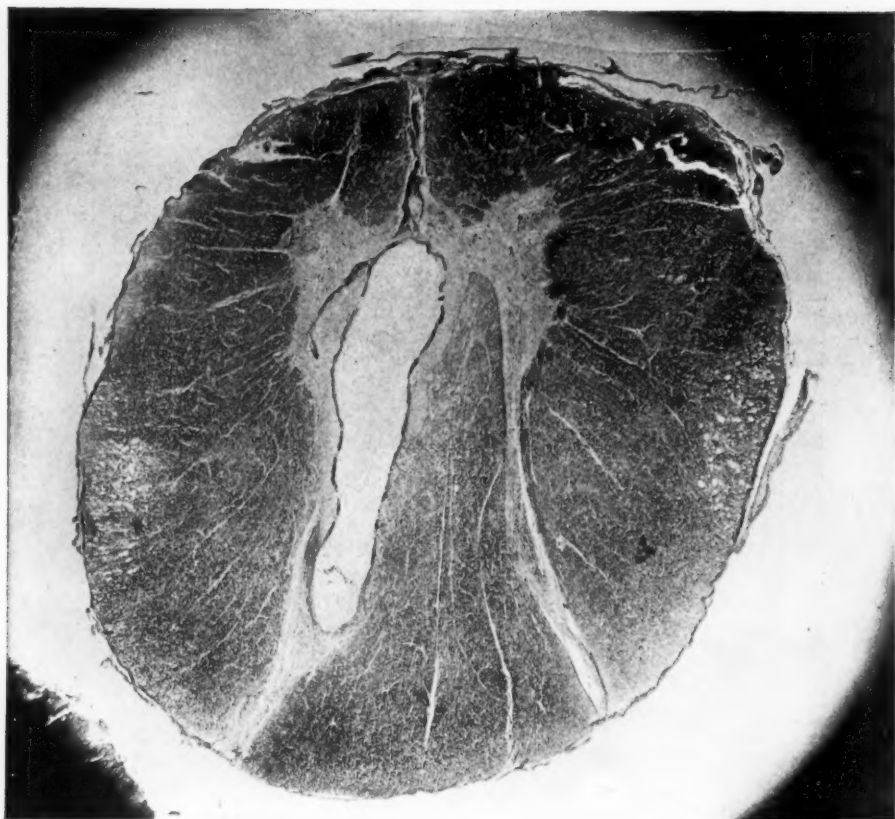


FIG. 9.—A section of the spinal cord in the thoracic region showing an area of softening in the gray matter, as well as an area of traumatic myelitis on each side in the anterior part of the direct cerebellar tract. Section stained by Weigert method. (Photo-Micrograph by A. R. Allen, M.D.)

allowed by way of argument, that the highest level of the specimen was the first thoracic segment—and that is the highest it could possibly be—then the fracture-dislocation involved most probably the fifth and sixth thoracic vertebra, crushing thereby the lower part of the seventh and upper part of the eighth thoracic segments of the spinal cord. This is a little lower than Dr. Spellissy thought at the time.

There was one interesting finding in this cord: an area of central softening (Fig. 9) extending from about 2 to 6 cm. below the level of fracture. That central area of softening, had he been able to examine every section serially, would probably have revealed a damaged blood vessel, possibly two or three, in relation to it. Traumatic hematomyelia is due to a purely hydraulic action in one or more of the branches from the anterior spinal artery within the anterior median fissure.

The question that Dr. Spellissy brought up as regards operation in these cases is one on which neurologists and surgeons will never agree, until some means is discovered by which the surgeon can say with a reasonable amount of assurance, "I can, by this method, so successfully bridge over the injured portion of the spinal cord that there will be functional continuity." That of course is a perfect impossibility as yet. In the first place there is an absence of neurilemma nuclei in the spinal cord and on these neurilemma nuclei is regeneration supposed to depend. In going over records of hundreds of cases he had been impressed by the fact that those cases which have had expectant treatment have had as high a percentage of would-be cures as those operated upon.

DR. RICHARD H. HARTE said that the manner of dealing with these cases of spinal injury is the point which interests surgeons. A man falls from a roof, or something falls on him, and he is forcibly bent forward, the vertebra gives way at the vulnerable point, the juncture of the first lumbar and last dorsal, and as a result there is in all probability a partial dislocation, and a fracture possibly of the lip of the upper or lower portion of the body of the vertebra. Now the question comes up, what are we going to do with these cases? As a rule they are fatal. If there is a certain amount of pressure on the cord without any destruction of the cord substance the sooner that pressure is removed the better the chances of recovery. On the other hand, if there is a

certain amount of pressure on the cord, and it is not relieved, the patient being treated expectantly, the cord will in a short time degenerate, and then there is very little to be expected in the way of recovery. It seemed to him if he were in a position where he had a fracture of the spinal column and had to decide the question whether he would rather lie on a water bed for a time and then die as the result of bedsores, cystitis, etc., or have his neural canal opened and dealt with, he should certainly take the chances and have his canal opened. He thought that on the whole, if one gets one per cent. of recoveries one is fortunate.

He recalled one case where he did an operation for this condition. The man had a fracture of the lower portion of his spinal column and he is now putting up gutters and tin roofs through the country!

He had opened many canals with indifferent results, but on the whole he thought this procedure offers to the majority of cases the best chance of recovery. He could not see, in these cases, what was to be gained by treating them expectantly. By waiting a degeneration of the cord is likely to occur, and when that occurs, as the result of pressure, little can be later accomplished by going into the neural canal. He had tried both ways, and while the results are not brilliant in either, he had obtained better results by promptly relieving the pressure.

DR. ALFRED R. ALLEN said that it was doubtful whether in fracture-dislocation of the spinal column, the degeneration of the cord which is found in cases which have lived some time after the accident, is due to unrelieved pressure. He mentioned a case of gunshot wound where the bullet impinged instantaneously on the dura, not enough to even ruffle the surface. A laminectomy revealed the cord apparently normal. The case died, and the cord at autopsy was found to be just like jelly for at least three centimeters. In this case there was a pressure which had been brought to bear and then instantly removed, and yet there was complete degeneration.

PUNCTURED FRACTURE OF THE SKULL.

DR. GEORGE G. ROSS read a paper with the above title, for which see page 108.

DR. ADDINELL HEWSON said that in view of the statement made by Dr. Ross that the cerebral abscess is often not recognized,

he would report a case which in the last few days came under his observation. A man died in one of the hospitals in Philadelphia from pulmonary tuberculosis with intestinal involvement. The body was unclaimed and came to the Anatomical Board and was distributed to one of the colleges. After the injection of the body the brain was removed, and there was found a nail nearly $2\frac{1}{2}$ inches in length which had perforated the sagittal suture near the bregma, and an abscess was found about this nail probably holding as much as an egg. He questioned the resident of the hospital—he did not even know that there was any wound about the man's head. The nail did not penetrate the brain, it was between the longitudinal sinus and the brain substance involving the dura and the arachnoid.

He mentioned this case here as one where there were no symptoms of any kind, and the resident who attended the man for six months knew nothing whatever about this condition.

DR. G. G. DAVIS said that he had seen a couple of cases of these punctured wounds, one a man who received a punctured wound of the orbit by a metal hook which penetrated the brain, going upwards and backwards. The point of the hook struck the dura in the upper posterior portion of the vault of the skull. This case occurred while he was a resident at the Pennsylvania Hospital. The man died from septic cerebritis. A second case was under his care some fourteen years ago for the first time. The patient, a young man, was riding on a bicycle and was struck by a wagon, and something penetrated his eye. The left eye was lacerated and the wound entered through the top of the orbit and went some distance into the brain. The eye was removed, as well as some pieces of glass, and for several days thereafter there was quite an amount of brain matter discharged. He introduced a drainage tube and simply washed the part out with boracic solution. That young man recovered, and he heard nothing from him until within a few months ago, when he came back with the report that he had attacks, which he took to be epileptic, which were preceded by a very offensive subjective odor, and he likewise complained of a headache. For this he was placed on bromides, and he has had no attacks since, although he only takes ten grains of bromide of sodium once a day. This is an example of the fact that if the brain is injured very markedly, and if recovery ensues, the patient later shows some nervous trouble.

HERNIA CEREBRI.

DR. MACY BROOKS reported a case of recovery from hernia cerebri involving the frontal lobe, resulting from extensive fracture, as follows: A boy of 11 years, rather low order of intellect, was kicked in the head by a horse.

When first seen there was a large gaping wound over the left brow from which blood and brain matter were oozing.

An incision was made from the glabella, inclining upwards towards the upper temporal region, exposing a compound comminuted fracture. Fragments of bone were removed which included the crista galli and a large portion of the frontal bone of that side; this exposed an opening in the dura three-fourths of an inch in diameter; the dura had been punched out over this opening and driven into the gray matter. Upon probing this cavity with the little finger he felt something hard in the brain substance about an inch in from the cortex, parallel with the base of the brain. Upon introducing a pair of forceps he extracted a fragment of bone and a matted lock of hair. The boy being very dirty, the accident having happened in a stable, and there being extensive laceration of brain matter, he did not close the opening in the membranes with a pericranial flap. After removing all loose fragments of bone and trimming up the edges, the wound was well irrigated with hot saline solution, a strip of iodoform gauze was introduced and the wound dressed with gauze and a firm bandage.

The patient was not unconscious at any time. He recovered nicely from the operation. On the third day the gauze was removed from the cavity. Its removal was followed by a flow of a considerable quantity of disorganized brain matter. A small drain was reintroduced; this was removed in twenty-four hours. By this time the brain had started to protrude. There was a hernia about the size of a pigeon egg. This upon the advice of Dr. W. J. Taylor was dressed with a ring of gauze to avoid pressure and dry gauze over the ring. The skin edges were touched at each dressing with silver stick and as the skin grew in around the hernia, the protruding gray matter was gradually cut off until the opening was entirely closed. Apparently the boy's mental condition has not changed in any way since the accident. The wound healed in forty-eight days.

DR. G. G. DAVIS said that this case is simply another which shows that it is apparently unnecessary to operate for the cure of hernia cerebri, and in substantiation of that position he mentioned a case somewhat similar to this, in which he saw a hernia cerebri on the vault of a skull from a fracture in which the protrusion of the brain was approximately $1\frac{1}{2}$ inches long and oval in shape. Gauze was placed around it very much as in Dr. Brook's case, only it was wet with alcohol. He thought that the alcohol tends to tan and shrivel and dessicate the hernia cerebri. In a few weeks contraction took place and the skin covered it. Unfortunately the child, which was quite young, was said later to be completely blind. In the majority of these cases some decrease in the mentality of the patient is later to be expected.

DR. JOHN H. GIBBON called attention to the portion of bone which had been driven in. This recalled to his mind a case he had assisted Dr. Keen operate upon. The patient was a soldier who had been shot in Cuba. He was trephined shortly after his injury; he then developed epileptic attacks and was operated upon again in Cuba. He then came back to this country, was admitted to one of the large hospitals and operated upon again, an osteoplastic flap being turned back. He was then sent home as apparently incurable. He continued to have his attacks and got into pretty wretched condition. He applied for admission to the Jefferson Hospital, and through certain influences, although it was thought there was little to be done for him, he came down to be examined. It seemed that there was some pressure which might be relieved. Dr. Keen operated upon him, and about an inch and a half below the brain surface, near the median line, in the parietal region, he found a piece of bone as large as the first joint of the thumb, with about an ounce of pus around it. The patient had been trephined three times, once immediately after the injury and twice subsequently, without this bone being discovered. The necessity for exploring the brain thoroughly where there is a comminution of the skull, is most important.

DR. RICHARD H. HARTE said that Dr. Gibbon's remarks recalled to his mind a case at the Pennsylvania Hospital where a boy was injured, being hit over the brow with a brick, resulting in a large scalp wound. There was also a distinct transverse linear fracture with slight depression in one spot, but without any symptoms. The tendency in many cases would have been

to let it take its course, but for some reason or other he felt suspicious about it. He therefore explored it and found some gritty substance, raised up part of the anterior lobe and worked back into the anterior fossa, and took out about a teaspoonful of plaster. The boy was evidently struck with a brick which had plaster on it, and this plaster had been scraped from the brick by the receding skull and deposited in the cranial cavity.

This only goes to prove that many times a fracture may be carefully explored and nothing found, while at other times something is found, and he therefore agreed with Dr. Gibbon that it is best to make a thorough exploration of these cavities.

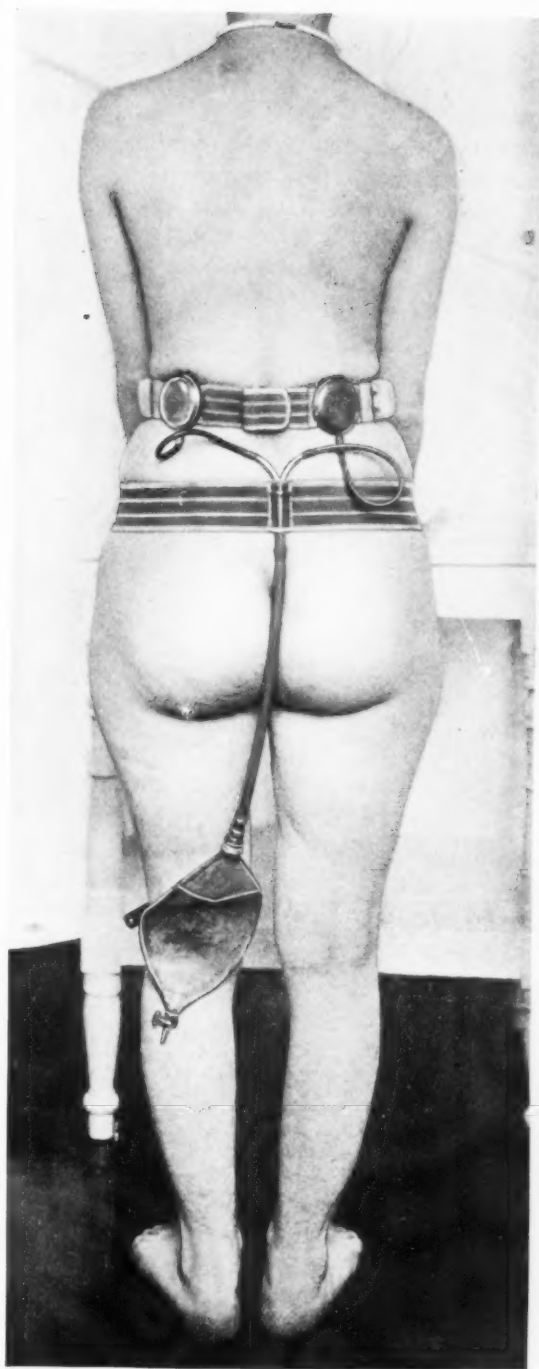
PERMANENT DRAINAGE OF BOTH KIDNEYS THROUGH LUMBAR OPENING.

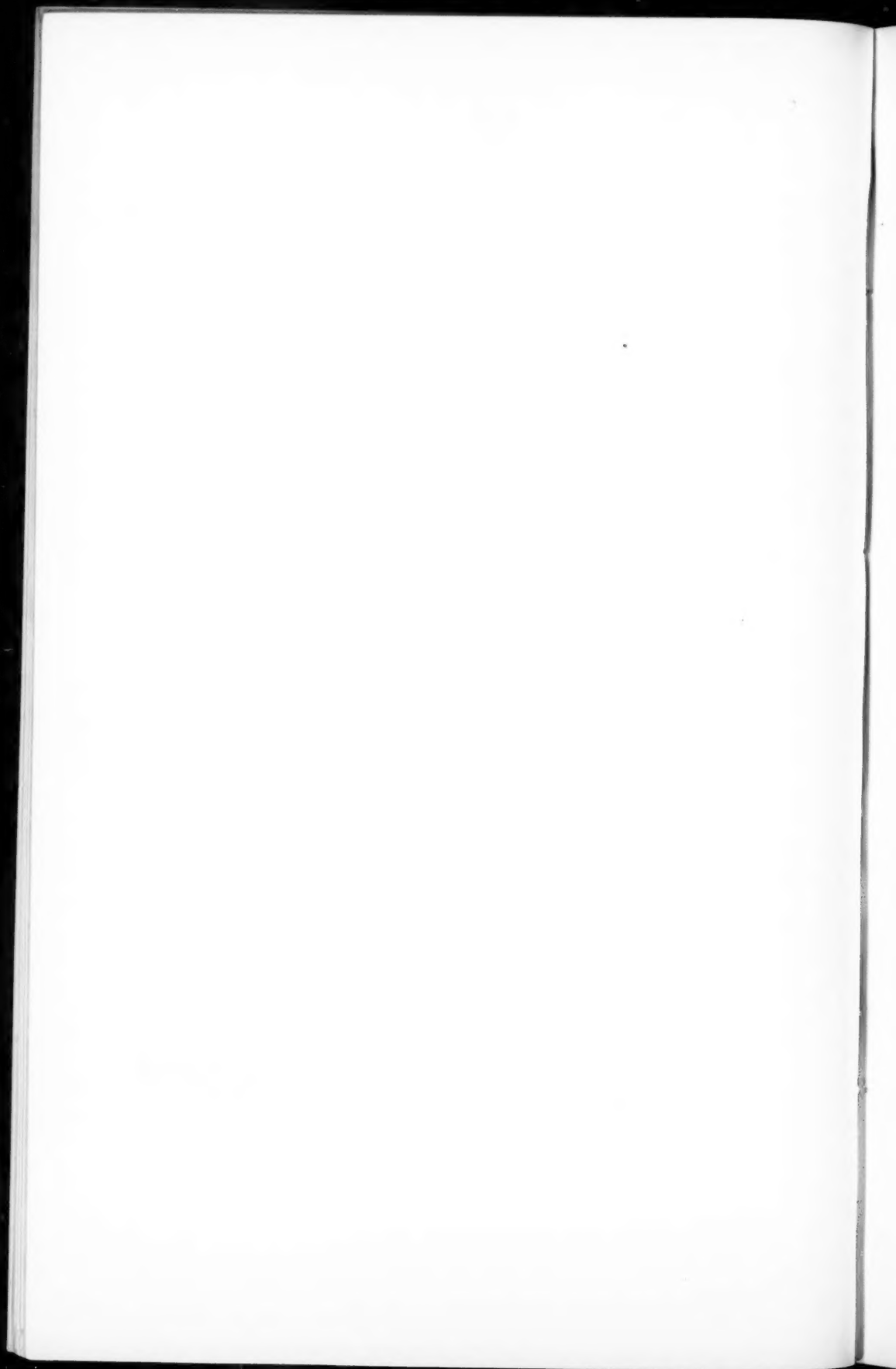
DR. HIRAM R. LOUX described a case of permanent drainage of both kidneys, and exhibited the apparatus used for the collection of the urine.

DR. JOHN B. ROBERTS asked whether this apparatus would answer satisfactorily in cases of tuberculosis, extirpation of the bladder, or other conditions of the bladder where some such measure is necessary?

DR. HIRAM R. LOUX said that the apparatus shown would answer very well for tuberculosis, especially where the condition of the bladder was such that it made the patient a great sufferer. In extirpation of the bladder it would hardly do, unless the ureters were removed at the same time.

This patient was instructed about the care of this apparatus, and she boils the catheters fifteen minutes and takes the utmost care with the urinal so that there is no odor attached to its use.





BOOK REVIEWS

HUMAN ANATOMY, INCLUDING STRUCTURE AND DEVELOPMENT, AND PRACTICAL CONSIDERATIONS. By THOMAS DWIGHT, M.D., LL.D., Professor of Anatomy in Harvard University; J. PLAYFAIR McMURRICH, M.D., Ph.D., Professor of Anatomy in the University of Michigan; CARL A. HAMANN, M.D., Professor of Anatomy in the Western Reserve University; GEORGE E. PIERSOL, M.D., Professor of Anatomy in the University of Pennsylvania; and J WILLIAM WHITE, M.D., LL.D., Professor of Surgery in the University of Pennsylvania. With 1734 illustrations, of which 1522 are original and largely from dissections by JOHN C. HEISLER, Professor of Anatomy in the Medico-Chirurgical College, Philadelphia. Edited by GEORGE A. PIERSOL. J. B. Lippincott Company, Philadelphia and London. 1907.

To the students of anatomy, this new treatise edited by George A. Piersol, Professor of Anatomy in the University of Pennsylvania, will be welcome. The works of Gray and Morris and Quain have for many years been preëminent, but it is probable that this new treatise, which is the most complete that has yet appeared in the English language, will replace these other works, especially in the medical schools throughout the United States. The book presents the essential facts of human anatomy regarded in its broadest sense, and is most extensively illustrated in such a way as to elucidate very clearly the subject matter. Dr. Thomas Dwight has written the description of the skeleton including the joints, of the gastro-pulmonary system and of the accessory organs of nutrition. Dr. Carl A. Hamann has written the section on the cerebro-spinal and sympathetic nerves. Dr. J. Playfair McMurrich, who is without question one of the foremost anatomists of this country, describes the muscular, the blood and the lymph-vascular systems. No one who has studied under Professor McMurrich could doubt his ability to present this subject most thoroughly; system, conciseness, accuracy, characterize his descriptions. The illustrations of this part of

the book are exceptionally good and are well-chosen. The relation of the bones to the muscular system has been well worked out. Most of the recent text books describe the bones without showing graphically the points of attachment of the muscles to the bones, but to the student the conformation of a bone means nothing unless there is associated with it something attached to it or in relation to it; this point has been appreciated by the authors and in all of the illustrations of the bones, the points of attachments of the muscles to them have been outlined in red. It would have been better still had the name of the muscle been printed upon the area of attachment of the muscle, instead of using a line with the name printed in the margin. The vascular system is carefully described, and its embryology, histology and the composition and development of the blood constituents are all faithfully detailed. Considerable space is given to a description of the heart, and the practical anatomical considerations concerning it. Dr. Piersol has written the introductory, histological and embryological paragraphs throughout the work, and has contributed the descriptions of the central nervous system and the deep relations of the cranial nerves, especially the uro-genital system. It is needless to say that his work has been thoroughly done.

As surgical work has advanced, so have the demands for more accurate knowledge and teaching in the relation of the organs and tissues of the body to each other, and a more adequate consideration of the practical applications of anatomy; that is, the association of anatomical facts with those conditions resulting from injury and disease. Dr. J. William White has undertaken this department of the work, and his experience as a surgeon and as a teacher of surgery has enabled him to do it most thoroughly; he shows the practical relationship between surgery and anatomy. This feature occupies quite a distinct place in the book and adds greatly to its value. The field of operative surgery is in no way covered, although brief descriptions of operative methods have been given in some instances, and it shows the student the importance of a thorough understanding of anatomy before the surgical treatment of any condition can be undertaken. The many new and exact illustrations are important features of the book. Some of the anatomical text books which have been published in recent years have borrowed

their illustrations from other books and in so doing have lost their originality and therefore their value. The present publication is by far the best work on Human Anatomy, by American authors, that has yet appeared.

PAUL PILCHER.

SURGICAL DIAGNOSIS. By DANIEL N. EISENDRATH, M.D., Adjunct Professor of Surgery in the Medical Department of the University of Illinois (College of Physicians and Surgeons). Octavo of 775 pages, with 482 original illustrations, 15 in colors. Philadelphia and London: W. B. Saunders Company, 1907.

Dr. Eisendrath has set for himself a most difficult task. As Killaini has said: "There can be only one diagnosis, *i.e.*, the true scientific diagnosis in medicine. Surgery has to do only with the treatment." It is the conditions, then, that demand surgical treatment which must be included in any work on surgical diagnosis. Another reviewer of this volume has asked the question: "Why did Eisendrath write this book?" There is hardly any branch of the science of medicine which needs more light thrown upon it, more study devoted to it, than this subject of surgical diagnosis, which has been most shamefully neglected in the writings of authors. Foreign surgeons have produced one or two small treatises on this subject, but they have been most childish in their incompleteness.

Dr. Eisendrath has chosen to treat the subject of surgical diagnosis chiefly from the clinical standpoint; that means that he has omitted almost entirely the pathological side of the question, which is daily gaining more and more importance in the establishment of any diagnosis. In discussing each disease it would seem to the reviewer that the symptoms, complications and sequelæ have not been carefully and clearly enough dwelt upon, to render the recognition of the disease unmistakable; oftentimes the differential diagnosis is more fully considered without enough care being taken in describing the direct diagnosis.

There are eight chapters in all. The first chapter considers the surgical affections of the head; the various injuries and diseases of the scalp, skull and brains are considered together, and from the clinical aspect this is a very logical arrangement. This section of chapter I is by far the most interesting and thor-

ough; the descriptions are clear and the points in differential diagnosis are well contrasted. The illustrations are excellent, and there are a number of tables which allow of a rapid review and comparison of surgical conditions whose symptoms closely simulate each other. The intra-cranial complications of middle ear and mastoid suppuration are considered, but why the surgical diseases of the middle ear and mastoid should be omitted is not clearly understood.

Chapter II takes up the surgical affections of the neck. It would seem that here the author many times tends to leave out the ordinary subjective symptoms which the patient feels, and does not dwell sufficiently long upon the previous history of the patient, seldom speaking of the course of the disease and the changes which may take place from time to time as the disease progresses. The thorax, abdomen, extremities and spine are taken up in detail.

Chapter VII is devoted to post-operative complications; the last chapter, to methods of examination. The section upon cystoscopy and ureteral catheterism was written by Dr. Gustav Kolischer. The illustrations of cystoscopes show the types of cystoscopes in use twenty years ago by Brunner and Nitze; these instruments have long since become obsolete, more useful ones having been invented by American surgeons. The book is very well written, is well illustrated, and is by far the best work that has yet appeared on the subject of surgical diagnosis.

PAUL M. PILCHER.

MANUAL OF OPERATIVE SURGERY. By JOHN FAIRBAIRN BINNIE, A.M., C.M. (Aberdeen); Professor of Surgery Kansas State University, Kansas City. Philadelphia: P. Blakiston's Son & Co. 1907. The first edition of this book was thoroughly reviewed in Vol. XLII, 1905, of the ANNALS OF SURGERY. Within two years two editions have been exhausted the present being the third revised edition.

The Manual is unique in the field of operative surgery; the name which has been given to it, describes it. It is rare that a surgeon writing such a book can resist the temptation of giving the etiology, the symptomatology and often his personal preferences in the treatment of surgical affections, but this has been accomplished in the present work. A description of the opera-

tions on the female pelvic organs, on the arteries, on bones and on joints are omitted. Each chapter takes up a certain surgical condition and the most practical operations for the relief of that condition are given. All antiquated methods are omitted. The descriptions are clear, short and well illustrated, in many places illustrations take the place of lengthy descriptions. Some chapters close with well-chosen remarks by the author containing his own preferences and advice resulting from his own experience. The book is a very serviceable one and is designed for practical use by the surgeon.

PAUL M. PILCHER.

THE TECHNIC OF MODERN OPERATIONS FOR HERNIA. By ALEXANDER HUGH FERGUSON, M.B., C.M., F.T.M.S. Professor of Clinical Surgery, Medical Department of the University of Illinois; Professor of Surgery at the Chicago Post-Graduate Medical School, Chicago, Ill. Illustrated by reproductions of original drawings from the author's collection. Chicago, Cleveland Press, 1907.

The text of Ferguson's book is divided into two parts, Part I giving the general considerations, classification, indications for operation, aseptic and surgical technique, complications of hernia, and the results of operations for hernia. Part II is devoted entirely to operations for the cure of hernia.

The work presents only the surgical phase of the subject; while omitting discussions of etiology, symptoms and diagnosis, some space is given to the causes leading up to and predisposing to hernia. The author has had a wide experience in the treatment of hernia and naturally preference is given to the expression of his own ideas concerning the proper methods of preparing for and operating upon hernia. At the same time he quotes freely from the literature and faithfully describes the operations of other men. The illustrations are clear and good, but are not well distributed throughout the book, seldom appearing opposite the text which they illustrate. The author goes into detail in treating of the various suture materials, the methods of preparing the patient, and makes throughout many pertinent remarks relative to the personal equation on the part of the surgeon. He prefers antiseptic to aseptic catgut. His methods of preparing the patient for operation are very good and show that he considers simplicity

and routine in these matters of importance. He insists upon the surgeon changing all clothing before the operation, and would prohibit talking by the surgeon while operating; two points in operative technique which most men do not observe. He recommends that the appendix be always brought out and inspected through a hernia wound, and also recommends that, if desirable, a thorough examination of the pelvic and abdominal cavities may be made through the wound which is to be enlarged if necessary. In speaking of the necessity of operating upon inguinal hernia when present, he writes as follows:

"All hernias of the inguinal variety in both sexes between two and forty years of age, should be cured by operation if circumstances and physical condition permit of it. No young man or woman is doing justice to his or her development and health by nursing a rupture during school or college life, let alone the many risks incidentally encountered on play-ground and campus."

The mortality following hernia operations he gives as less than one-quarter of one per cent. In illustrating Kocher's operation for inguinal hernia, he gives the lateral transposition method, while Kocher now uses the transposition method by invagination, where feasible, which he considers a marked advance in the technique of his operation. He accepts the advice of Bloodgood in opening the sheath of the rectus muscle and suturing the muscle to Poupart's ligament, where the conjoined tendon is not sufficiently strong to be used. The advisability of this would be questioned by some surgeons. The monograph is one of the best and most thorough treatises that has yet appeared on the surgical aspect of hernia.

PAUL M. PILCHER.

MANUAL OF SURGERY. By ALEXIS THOMPSON, F.R.C.S., Assistant Surgeon Edinburgh Royal Infirmary, and Alexander Miles, F.R.C.S., Assistant Surgeon Edinburgh Royal Infirmary. Two volumes. Second edition revised and enlarged. Pentland, Edinburgh and London. 1906.

Volume I is a treatise on General Surgery, and although small, still contains 770 pages of reading matter. Such a treatise can not be considered a hand-book, and is a systematic view of the present-day aspect of surgery, meaning to be useful to the practitioner and at the same time available as a text-book and manual

for students; this, in fact, is its main purpose. Pathology has been somewhat slighted and is only given in connection with diagnosis and treatment.

Volume II deals with Regional Surgery. In many places the surgical anatomy of the part is given before injuries and diseases of the part are considered. Also, special methods of examination are carefully described. The work has been prepared with care, and as a manual for the student of medicine would be useful, but as a book for the practicing surgeon is lacking in many essentials.

PAUL M. PILCHER.

DISEASES OF THE RECTUM AND ANUS. By HARRISON CRIPPS, F.R.C.S. Third edition. 1907. J. & A. Churchill, London, and W. T. Keener & Co., Chicago.

This book commends itself to the profession as a full and exhaustive treatise upon the department of rectal surgery and well maintains its position as a valuable standard authority.

It presents at the outset a series of plates, of microscopical specimens, of normal tissue, and morbid growths, as valuable, if not more so, than any to be found in kindred works. The initial chapters on Anatomy, and examinations, and Diagnosis, are highly instructive; and the latter abounds in suggestions, alike valuable to the general practitioner and the specialist.

The author's position as to the use, or rather uselessness, of rectal specula except under anæsthesia, and his emphatic declaration that "The idea of using one on the consulting-room couch should be abandoned," may seem startling to many who do use them and value them highly, but it must be confessed his strictures in the main are sound; whether his like criticism of the use of the rectoscope is as warranted may be questioned.

In his consideration and treatment of malformations of the rectum, a most interesting series of cases is given, showing the results of operations in imperforate rectum and anus, in one hundred cases, with a mortality of fifty per cent. In the chapter devoted to hæmorrhoids, we find a careful delineation of the different varieties, with considerable space devoted to etiology, methods of examination, diagnosis, and illustrative cases. The author's suggestions for the treatment of inflamed and strangu-

lated tumors seem highly commendable, especially the one that indicates this condition as a favorable time to induce the sufferer to submit to operation for radical cure.

It is true that many will go through life suffering from this painful and enervating disorder, and never at any other time entertain the idea of an operation.

In the classification of methods for radical cure, the author differs but little from the position taken by most standard authorities. Crushing, and the method of puncture by hot needles, he passes with slight notice. The application of strong nitric acid is considered advisable mainly when the trouble consists of hæmorrhages from superficial vascular areas. Against the method of injections of carbolic solutions, he evidently shares the sentiments so long pervading the leading authorities.

In this he differs materially from the position favorable to this method taken by Professor Tuttle in his recent work (1903), *An attitude, we believe, borne out by the experience of many other specialists.* The author, however, admits that "in certain selected cases, with the proviso that the patient shall be perfectly at rest for two or three days following the injection, the plan may have a sphere of usefulness." From a large experience with this method the writer would be inclined to dissent from the necessity of imposing this restriction upon the majority of cases. In some it may be important, but if the solution is of moderate strength and the quantity injected not too large for the size of the tumor, the patient, as a rule, will suffer no inconvenience from moderate exercise. The object of this treatment being, as is so admirably indicated by Professor Tuttle, "The production of an inflammatory induration of the hæmorrhoidal mass," but which falls short of complete strangulation and sloughing.

In speaking of the Whitehead operation, while conceding that in the hands of the originator and others it had proved a valuable remedy, yet he makes the following significant statement, which from one of wide experience, demands consideration. "I have, during the last ten years, seen no inconsiderable amount of anal stricture resulting from this operation."

It is clear, that after according all due credit to other operative methods, the author's preference is given to treatment by ligature with which he combines the free use of the scissors in a method similar to that adopted by Allingham. His preparation

of patients, operative technique, after dressing and care in cases of secondary hæmorrhage leave little to be desired.

For the cure of prolapse of the rectum, the author favors the use of nitric acid in mild cases and the actual cautery in graver ones in preference to excision. The writer has in several cases had excellent results by combining the two methods as follows: Excision of triangular strips of membrane from the protruding mass followed by cauterization (actual cautery) of the denuded surfaces, the result being in each instance satisfactory and permanent.

In the chapter on rectal abscess and fistula in ano the delineation of anatomical relations, pathological processes, complications and methods of operation are very full and complete, but contain little differing from that to be found in other standard authorities.

In the treatment for the cure of anal fissure the author recommends dilatation, combined with the use of the knife, as against dilatation alone, making, he says, "a cut at least an inch in length and one-third of an inch in depth; and the reason for this preference is that "dilatation alone sometimes fails." In the subsequent paragraph he admits that failure also follows the above operation. This position in favor of the knife, as against divulsion is maintained by Kelsey for a different reason, *i.e.*, that it can be used without general anæsthesia with cocaine. Neither of these reasons seems to the writer to justify this preference. Unless the incision is deep enough to set the muscle effectually at rest, it is also liable to failure; and as an operation, it is far more formidable to the patient, involving far more pain, inconvenience and detention from business. It may be fairly asked, what is there against divulsion to justify the surgeon in submitting his patient to this greater sacrifice? What is the aggregate percentage of failures? Dolbeau, of Paris, so strongly favors dilatation that he scarcely admits the justification of any other method. Vanburen and Allingham used it extensively. Matthews says emphatically, "all cases of fissure of the anus, with the rarest exceptions, are curable by divulsion of the sphincter muscles." He makes a marked distinction which the author does not seem to do between fissure, and the rounded irritable ulcer often found higher in the bowel, for which he reserves the use of the knife. The writer's experience in a little over seven hundred cases, treated by divulsion, was prompt healing and disappearance of

all symptoms in ninety-three per cent. (non-malignant). In the chapter on Stricture of the Rectum, we find a very careful and accurate delineation of this troublesome disorder and its complications. The author lays special stress upon the importance of early and faithful efforts at gradual dilatation, when much can be accomplished in the way of cure which later may be impossible. His wise caution against the injudicious use of forcible dilators and deep internal incisions without proper drainage, commends itself to every conservative mind, and his declaration that "posterior lines proctectomy, with complete division of the external parts," is one of the most valuable methods that surgery offers for the relief of rectal stricture, will meet with general approval. The same may be said of colotomy, which he commends as the remedy best available for the undilatable tubular strictures, which are located too high for safe incision. Perhaps the section of this work, which will deservedly receive the widest attention, is the several chapters devoted to cancer of the rectum, including the Jacksonian prize essay on Cancer. This voluminous section constitutes without doubt one of the most thorough and exhaustive treatises to be found upon this subject in any kindred work.

Etiology, Questions of Inheritance, Tendencies to Recurrence, Methods of Extinction, are all most fully canvassed, but the main interest centres in the chapters devoted to operative procedures for the relief and cure of this grave disorder.

When we consider that but thirty years ago excision of rectal cancer was mentioned in the leading text books, only to be condemned, the achievements indicated in this and other recent works show the marked advance in rectal surgery as keeping full pace with all other departments. The author's distinctions between cases, where excision is justifiable and those that seem hopeless shows a wise conservatism. He gives a series of tables showing results in a large number of cases that are highly instructive and interesting, and should go far toward removing any remnant of doubt from the professional mind as to the justification of this operation.

Table E is of special interest, showing the mortality from excision in 85 cases, with the subsequent history of those that recovered. Of the 85 cases only 4 died, while 81 survived. Of those recovering, in 33 the disease recurred, while 32 remained well and apparently cured for a period of three years. When

we remember the fatal nature of the unchecked malady the above sum shows most encouraging results.

The table showing the results of the author's private operations in colotomy is also of interest, as indicating this as a valuable means of palliation and prolongation of life in cases where excision is clearly inadmissible.

J. RUSSELL TABER.

EYE INJURIES AND THEIR TREATMENT. By A. MAITLAND RAMSAY, M.D. James Maclehose & Sons, Glasgow, and The Macmillan Company, New York, 1907.

This book, as the author indicates in the preface, is simply a series of lectures on Eye Injuries and Their Treatment collated and edited in such manner as to make them presentable in book form for the use of the general practitioner.

The clear, concise and graceful style of Dr. Ramsay is well illustrated in this volume, and the eleven chapters comprising it make interesting and instructive reading for the specialist and general practitioner as well; though it should be borne in mind that the book is not, and was not intended by the author to be, a standard work on the subject.

In the series of lectures here presented, the author enters not at all into abstruse theory as to the care and treatment of eye injuries but confines himself rather to the domain of reasonable conservatism and of broad personal clinical experience, thereby appealing especially to the general practitioner who, perchance, may be called upon to treat injuries to the eye without having the opportunity of recourse to the specialist.

Notably, chapters IV, V, VI, VII, IX, X and XI are to be commended for the scholarly and lucid manner in which the author presents their subjects and the chapter on serpiginous ulcer of the cornea is a classical thesis in itself.

Penetrating wounds and retention of foreign bodies in the eye-ball are ably and fully described and their management advocated in accordance with the most modern methods.

The Sideroscope, Magnet, X-ray apparatus and the method of localizing intra-ocular foreign bodies are described in a practical way.

The chapter on sympathetic ophthalmia is excellent and, while it adds nothing new to our knowledge as to its causation,

the ground is thoroughly covered. The indications and contra-indications for enucleation in this unfortunate malady, often so perplexing to the ophthalmologist, are discussed in a convincing manner, and the rules governing it which he formulates at the conclusion of this chapter are logical and definite.

Under ocular therapeutics, the author reviews about all of the newer remedies of value, including serum therapy and many of the older ones as well. Subconjunctival injections, heat, cold and counter-irritants receive their share of attention, and under this latter heading it is interesting, even astounding, to note that the *seton*, applied at the nape of the neck or temple, is recommended for certain kinds of ocular inflammations. *This will not* receive the endorsement of American Ophthalmologists.

Chapter XI, the last, concludes with "General Directions Regarding Operations on the Eye and, in the preliminary, operative and post-operative care of his patients, Dr. Ramsay advocates the employment of anti- and aseptic methods in so far as they are compatible with ophthalmic practice.

There are 25 plates, in colors and in black and white, all of which are excellent.

The rest of the book, 50 pages, is made up of formulæ in use at the Glasgow Ophthalmic Institute. The work is printed in large clear type on heavy durable paper, and as a whole does great credit to the author, and he may well be proud of it.

J. SCOTT WOOD.

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